MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Study Report

Date: December 16, 2021

To: Project Management Team

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Subject: Study Report - FINAL

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO) and Minnesota Department of Transportation (MnDOT)

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I. Executive Summary

1. Corridor Context

The Highway 169 Corridor Study reviews a segment of US Highway 169 through the Mankato/North Mankato area in south-central Minnesota. Mankato/North Mankato population is 53,488 (according to the 2010 Census) with an urbanized area over 58,000 and a planning area population over 61,000. Major industries include Health Care, Educational Services, Social Assistance, Agricultural Services, and Machinery Manufacturing.

The geography of the study is the Hwy 169 corridor routing from the intersection of Hwy 169 and State Highway 60 on the southwest and the Hwy 169 North and Lake Street NW on the north. The corridor has a range of different contextual settings, factors, and needs, each with unique and interrelated challenges and opportunities.

The Mankato/North Mankato area has experienced steady growth since 2000. The MAPO area had an estimated population of 62,578 in 2012 and 65,175 in 2020, increasing 4%. Based on forecasts by MAPO the 2045 population is projected to be approximately 73,200, increasing an additional 12% from the 2020 estimation. The Minnesota Department of Employment and Economic Development (DEED) estimates approximately 59,399 jobs exist in the Cities of North Mankato and Mankato as of 2017. The largest industries are manufacturing, health care and social assistance, and retail trade. Approximately 20% of workers are employed in the manufacturing industry, which is typically an indicator for increased demand for highway efficiency.

2. Study Partners

Representatives from the Mankato/North Mankato Area Planning Organization (MAPO) and the Cities of North Mankato, Mankato, Blue Earth County, Nicollet County, and the Minnesota Department of Transportation (MnDOT) made up a Project Management Team (PMT) to oversee the study. The purpose of the PMT was to coordinate the project direction, review and provide input on the technical analysis and deliverables, manage the process and budget, and make final study recommendations.

3. Study Purpose

The purpose of the Highway 169 Corridor Study was to:

i. Define an ultimate vision for Highway 169 that is innovative, realistic, and ensures economic vitality and safety, mobility, and access for all modes of travel,

ii. Secure public and agency support for the ultimate vision, and

iii. Develop a detailed implementation plan outlining future improvement options, sequencing/triggers, timing, cost, and agency responsibility.

While the intent of a corridor study is to determine an ultimate vision, there is inherent flexibility built into the vision. The value of the corridor study comes from identifying and agreeing upon the needs and deficiencies to be solved and then evaluating a range of improvement options. The goal is not to select a single preferred alternative but rather to dismiss options that do not meet the purpose and need, leaving flexibility in a range of options making up the ultimate vision. The vision and its components can then be picked up for future consideration when project funding and required environmental review processes are identified.

The term “locally recommended vision” is used throughout this report to represent the ultimate vision recommended and supported by the full PMT – Mankato, North Mankato, Blue Earth County, Nicollet County, and MnDOT District 7. Additional design, study, and public discussion will be needed to move the components of the locally recommended vision forward into detailed design

and environmental review. At that time, a preferred alternative for each improvement area will be identified consistent with the requirements and process of the National Environmental Policy Act (NEPA) and/or Minnesota Environmental Policy Act (MEPA). The analysis and documentation of the corridor study was done to allow for a seamless transition into the future phases of project development for corridor improvements. This report and its many appendices with technical memorandums will serves agencies well in the future transition of this from study phase to implementation of individual projects.

4. Purpose and Need

As part of the corridor study process, a purpose and need was developed to define the transportation problems or deficiencies within the study boundaries. The formation of the purpose and need was based upon existing conditions data and stakeholder input received throughout the study process. The identification of needs helped build a common focus among stakeholders on the scope and timing of improvements through defining the "who, what, where, why, and when" of the transportation needs. This also provided project partners and stakeholders with direction on the need for additional analysis required in the next phase of the project development process.

The identified needs and opportunities within the study area also served as the cornerstone for developing evaluation criteria, used to create and evaluate a full range of concepts and design options that satisfy the specific project area needs.

The **purpose** of the Highway 169 Corridor Study is to identify context-sensitive transportation improvements along Highway 169 and the local supporting roadway system that will improve vehicle safety, maintain high levels of local and regional traffic operations, and enhance pedestrian/bicycle movements and safety throughout the study corridor. Future corridor improvements should also address infrastructure conditions, foster economic growth, and be supported by local jurisdictions through the municipal consent process.

The **needs** of the Study include Vehicle Mobility, Safety, Freight Movements, Multi-modalism, Pavement and Infrastructure Conditions, and Local Acceptance. Further detail on the Study Purpose and Need are included in **Attachment C.**

5. Key Issues

The PMT identified a range of key issues to be considered throughout the Study process through technical analysis and public and stakeholder input. These issues are summarized below. The key issues are explored in further detail in the Study Purpose and Need document (**Attachment C**).

- *Existing Capacity Needs:* All intersections overall operate acceptably with Level of Service (LOS) C or better. There are several intersections however with a movement or two that operate with LOS E or F during the peak hours. These include Lake St NW (North Access) at Highway 169, eastbound Trunk Highway (TH) 14 Exit Ramp at Highway 169, Webster Ave at Highway 169, County Road (CR) 33 at Hwy 169, and TH 60 at Highway 169. Additionally, the following intersections along Highway 169 have problematic queuing issues during the peak hours: Lind St, Webster Ave, Belgrade Ave at the SB Highway 169 ramps, Riverfront Dr at the SB Highway 169 ramps, Riverfront Dr at the NB Highway 169 ramps, and CR 33 at Highway 169**.**
- *Future Capacity Needs:* The 2040 no-build analysis showed that two intersections are anticipated to operate with excessive delay during the peak hours if improvements are not made. These intersections include: eastbound TH 14 Exit Ramp at Highway 169 and CR 33 at Highway 169. Additionally, problematic queuing is anticipated at the following intersections during the 2040 peak hours: eastbound TH 14 Exit Ramp, Lind St, Webster Ave, Belgrade Ave at the southbound Highway 169 ramps, Riverfront Dr at the southbound Highway 169 ramps, Riverfront Dr at the northbound Highway 169 ramps, CR 69 (Hawley St), and CR 33**.**

- *Access Spacing*. Several intersections along Highway 169 do not meet recommended spacing guidelines.
- *Safety*: The intersections of Lind Street, Riverfront Drive at northbound ramps, and Highway 68 are operating outside the normal range compared to similar intersections. The most common crash type at both Lind Street and Riverfront Drive were rear end crashes. The most common crash type at Highway 68 was right angle crashes. Of the seventeen crashes in the past five years at the Highway 68 intersection there was one fatal crash and one serious injury crash. Highway 169 from Belgrade Avenue to Highway 60 has a segment crash rate greater than the statewide average for similar corridors.
- *System Linkages*: Highway 169 is a principal arterial, National Highway System (NHS) route, and major freight corridor providing a north-south connection between Minneapolis-St. Paul, Mankato/North Mankato, and into southern Minnesota. Highway 169 also provides an important regional connection to TH 14. The Mankato/North Mankato area has experienced widespread growth across the metropolitan area and serves southern Minnesota as a hub for health care, education, retail, agriculture, and industry.
- *Local Connectivity & Accessibility*: Highway 169 provides important local connections passing through the Cities of Mankato and North Mankato. The corridor serves as the point of entry to both Downtowns in Mankato and North Mankato as well as to Minnesota State University Mankato. Highway 169 also provides important local connections to major industrial areas and highway commercial in Mankato, North Mankato, and South Bend Township. Overall, local residential, commercial, industrial, institutional, and recreational uses depend on local connectivity and accessibility to the highway.
- *Consistency with State and Local Plans*: Many previous plans and studies have been completed for the study's system corridors, in which many areas of concern were identified along Highway 169 with crash issues including at the Highway 14 interchange, Lind Street intersection, and the corridor segment from the Highway 14 south ramp to Webster Street. Previous efforts include five design concepts for the Highway 169 and Highway 14 interchange. Planned projects by MnDOT and the City of Mankato have also resulted. Proposed improvements include roadway expansion, ramp intersection reconfiguration, pavement preservation, pedestrian oriented safety improvements, trail extensions, and transit travel time and reliability solutions. Some of these projects have been programmed for implementation or are soon starting design. All planned and programmed projects will need to be considered in the development of concepts through this effort.

  Previous planning efforts have identified major population growth and some development/redevelopment along the Highway 169 corridor (i.e. Riverside North Redevelopment in Mankato and Webster Avenue in North Mankato). Population growth coupled with additional commercial, industrial, and residential uses may increase traffic volumes and safety concerns.

  Both the City of Mankato and City of North Mankato passed resolutions stipulating their consent to the Corridor Study in July 2019. Both resolutions are included in the previous studies section of this report, **Attachment A**.

  The City of North Mankato's Comprehensive Plan includes a policy related to Highway 169 listed in the Transportation System Goals, Objectives, and Policies, that states that full access conditions must be maintained at the Webster Avenue/Highway 14 intersection
- *Modal Interrelationships:* The planning area is served by several regional trail connections including the Rex Macbeth River Trail, Minnesota River Trail, West Mankato Trail, Northstar

Bridge Trail, and the Minneopa Trail. These trails provide pedestrian and bicycle connections along Highway 169. There are a few gaps that remain including crossing accommodations for pedestrians and bicyclists at Lind Street.

The area is serviced by the City of Mankato Transit with a few routes intersecting Highway 169 but none currently using the highway corridor.

- *Environmental Considerations:* There are some social, economic, and environmental (SEE) resources in proximity to the planning area that need to be considered that include environmental justice populations, several potentially contaminated sites, scattered stands of trees, grassy areas, lakes, streams, rivers, ponds, and wetlands. Any wildlife displaced by projects or construction resulting from the completion of this study will likely relocate to suitable nearby areas, including lands immediately adjacent to the project area. A FEMA controlled levee exists along the corridor on the river side of Highway 169 to minimize flooding associated with high water levels in the Minnesota River. The levee is a combination of earthen berm and concrete floodwall that provides flood protection for North Mankato, Mankato, and Le Hillier when the River is at flood stage.

6. Study Goals

The PMT identified six major study goal areas. These goals were used to provide guidance throughout the study process, including when identifying and evaluating potential improvement concepts. The identified study goals were: 1) Preserve community connections and economic vitality, 2) Reliable mobility for all users, 3) Safety of all system users, 4) Respect the environment and people, 5) Financial responsibility, and 6) Agency and public support.

7. Locally Recommended Vision and Implementation Plan

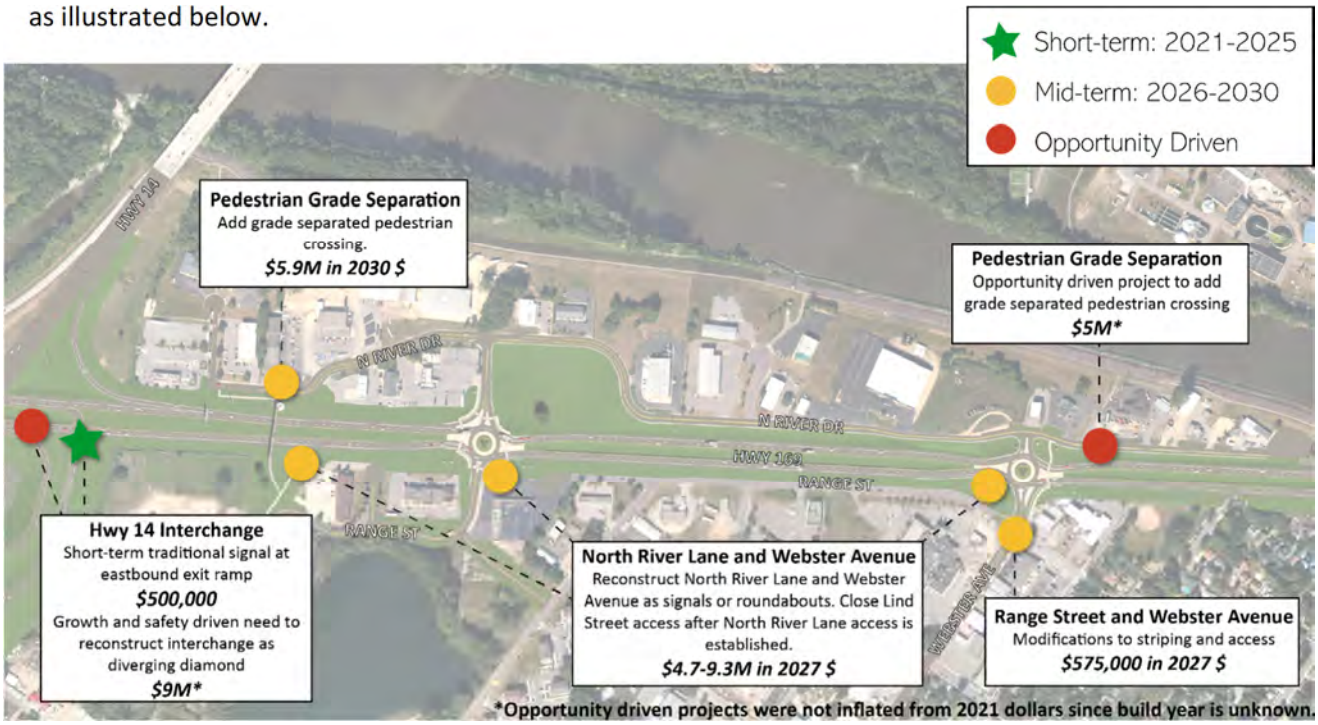
The locally recommended corridor vision was developed by the PMT and reviewed and modified based on public input. An implementation plan was also developed to prioritize standalone projects to be strategically and incrementally implemented over the next fifteen or more years. Timing of projects was organized into short-term (0-5 years), mid-term (6-15 years), or projects that are opportunity driven or only necessary with increased development or rise in safety issues. The mid-term projects are meant to align with MnDOT's planned investments for 2027, particularly in the Northern Subarea. The Southern Subarea is not currently in MnDOT's Capital Highway Investment Plan (CHIP) 2026-2031. Therefore, it will likely be several years before investments are made in this area. The overall implementation timeframes also coincide with the MAPO Long-Range Transportation Plan (LRTP) implementation timeframes for short-term (2021-2025) and Mid-Term 1 (2026-2030). The Highway 169 Corridor Study implementation plan does not have any projects that would align with the LRTP's Mid-Term 2 (2031-2035) or Long-Term (2036-2045). All remaining Highway 169 recommendations are shown in the Opportunity/Development/Safety Driven implementation category.

The locally recommended corridor vision and implementation timeframes are described below by subarea. It should be noted that the estimated project costs do not include right-of-way costs. A full

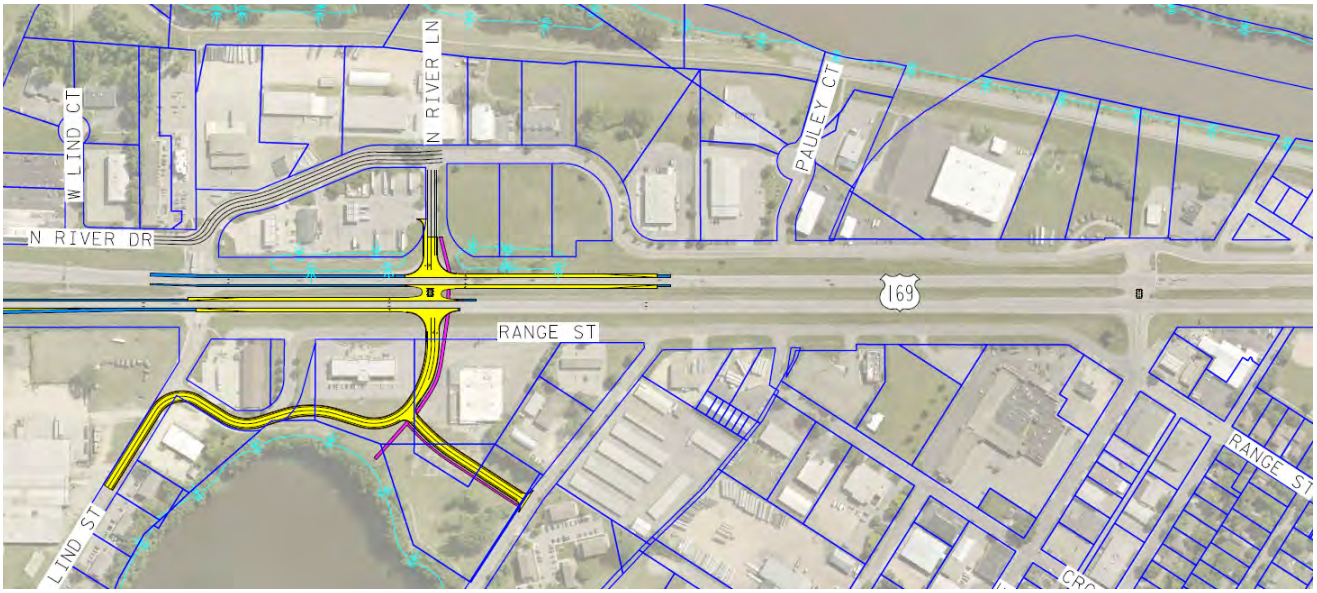
copy of the implementation plan is in **Attachment F** along with agency partner resolutions of support in **Attachment G.**

Northern Subarea – Locally Recommended Vision

The locally recommended corridor vision for the Northern subarea is to remain an at-grade expressway facility with improvements at the Highway 169/14 interchange, North River Lane, and Webster Avenue as illustrated below.



Roundabouts at North River Lane and Webster Avenue, as shown above, are recommended as a priority by the PMT; however, traffic signals at both intersections, as shown below, will also operate acceptably and could be considered for implementation if desired by agency partners.



A video animation was created and shared with the public to illustrate the short-term and mid-term improvements (roundabout version) for the northern subarea. https://youtu.be/xDqiNdFOGss

Middle Subarea – Locally Recommended Vision

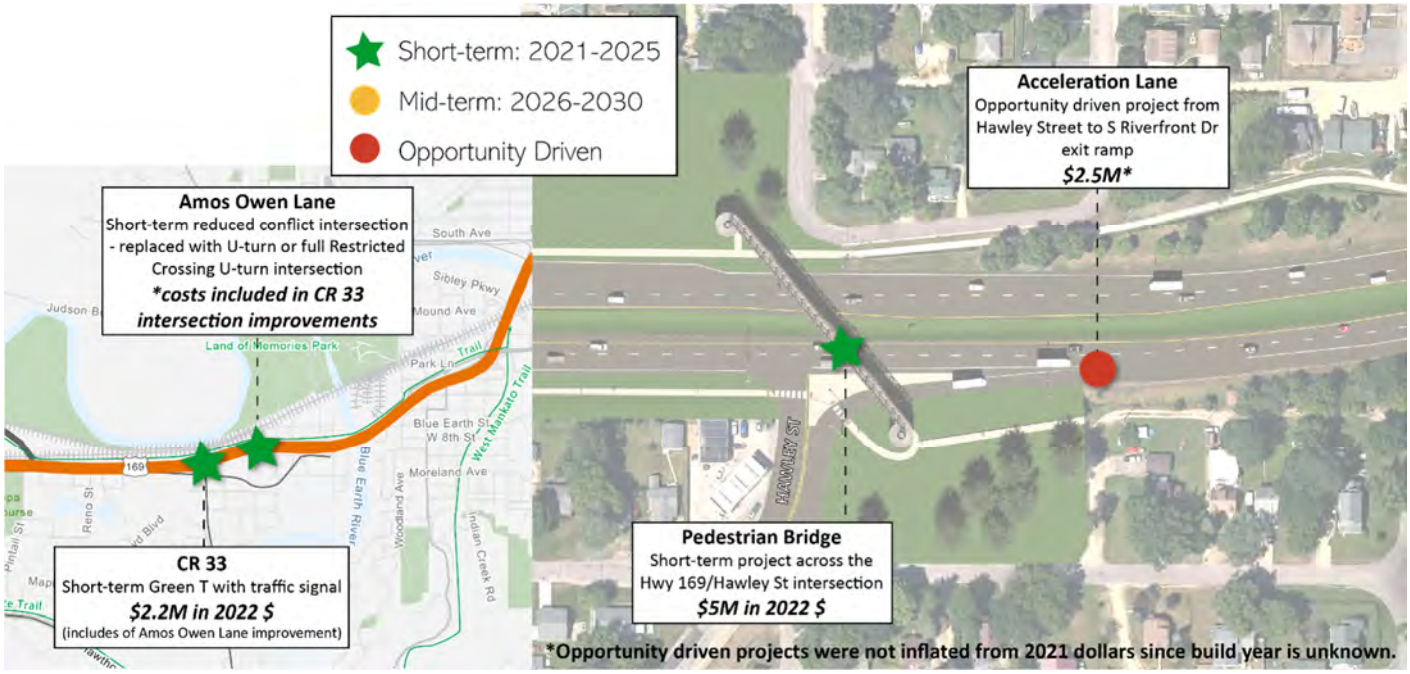
Five concepts (see pages 92-94) were recommended to be carried forward for further consideration in the middle subarea. MnDOT and the cities of Mankato and North Mankato will use these concepts as a starting point to engage in further analysis and public input to identify a preferred alternative with future programmed projects along Veterans Memorial Bridge and the Riverfront Drive/Hwy 169 interchange.

Southern Subarea – Locally Recommended Vision

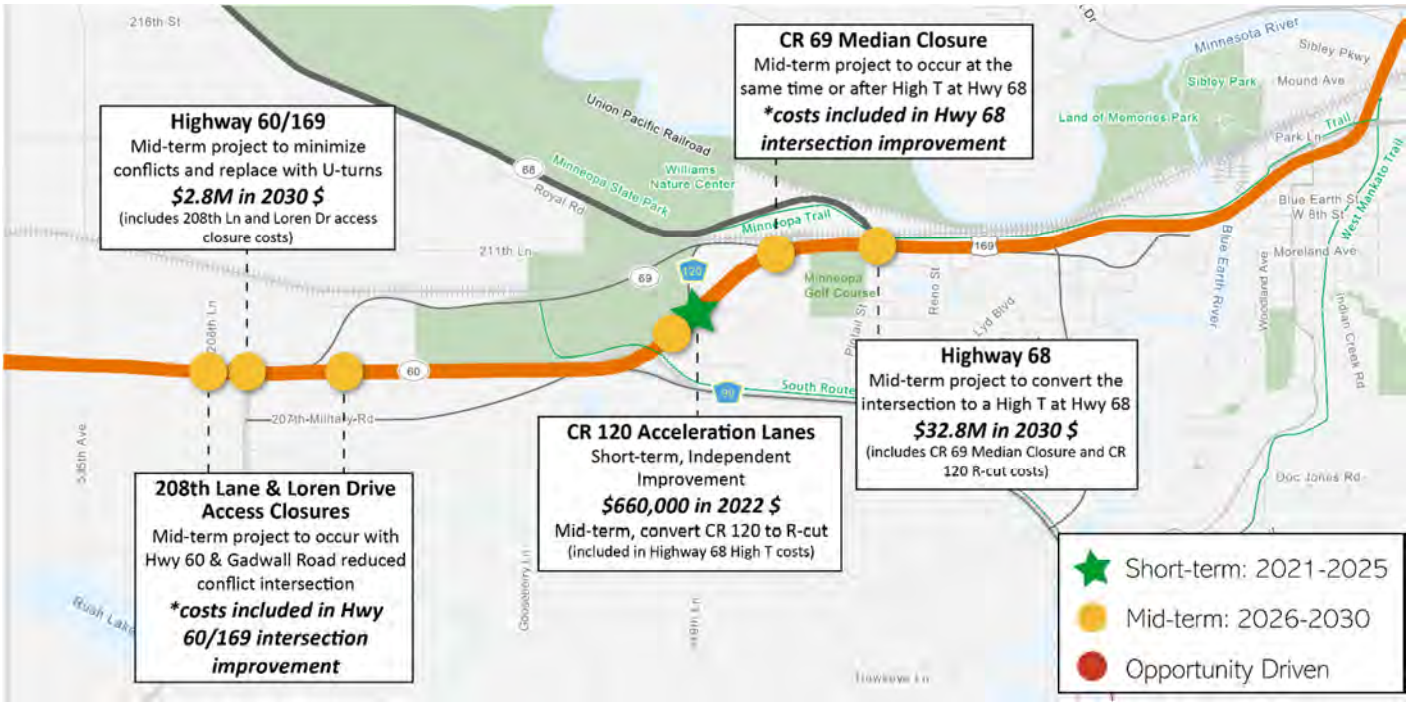
The Southern Subarea is not currently in MnDOT's Capital Highway Investment Plan (CHIP) 2026-2031. Therefore, it will likely be several years before investments are made in this area. Additional design, study, and public input will be needed to confirm the locally recommended corridor vision for this area. The design details and implementation timing will be further discussed by MnDOT and its partners at the time a project is funded and construction becomes more imminent.

Although there is no funding for this subarea currently identified through the year 2031, the PMT did identify a locally recommended corridor vision and implementation sequencing as part of the corridor study should funding become available. Further investigation on access control based on development needs or operational and safety issues may result in changes to the corridor vision based on conditions at time of investment.

The locally recommended corridor vision for the Southern Subarea is for a hybrid (partial at-grade/partial grade separation) expressway facility with improvements at the Highway 60, CR 120, CR 69, Highway 68, CR 33, Amos Owen Lane, and Hawley Street as illustrated in the figures below.



During the study, MnDOT expressed concern with the addition of a traffic signal at CR 33 due to its rural, high-speed character. MnDOT will revisit this recommendation when a project becomes more imminent to determine if an at-grade Green-T intersection is recommended versus looking towards partial grade separation improvements that would maintain free-flow conditions on Highway 169.



8. Next Steps

Ongoing discussions between the community and agency staff will guide future corridor improvements. Additional design, study, and public discussion will be needed for each of the recommended improvement concepts to move forward. The purpose of the Highway 169 Corridor Study was to develop a long-term plan for improvements. The concepts developed as part of this study are high-level and will need additional refinement through preliminary and final design. Environmental review and permitting will also be required with exact requirements based on the scope of the project and the funding source. See **Attachment D** of the Identification and Evaluation of Concepts Memo for environmental screening considerations and considerations for concept scores. Also see **Attachment B** Existing Conditions Report (Appendix C) for more detail on the study environmental review.

The improvement concepts identified within this study and the projects prioritized as part of the implementation plan will help MAPO, MnDOT, the Cities of Mankato, North Mankato, and Blue Earth and Nicollet Counties to continue to maintain a functioning yet safe principal arterial roadway.

Study engagement reported a recurring desire for corridor aesthetic and beautification improvements. Implementing agencies should continually assess and pursue beautification opportunities, including potential grant solicitation programs and cooperative cost participation scenarios. Cost participation scenarios should consider not only upfront/installation costs, but also additionally consider maintenance and upkeep responsibilities and respective roles of state and local governments.

Study partners must continue to work together to further plan, fund, design, and implement the recommended improvement projects. All partners have an active role in implementing these improvements. All competitive funding sources should be considered. Agencies should also update their comprehensive and transportation plans to include these findings to better leverage funding sources.

II. Introduction

The Highway 169 Corridor Study was initiated by the Mankato/North Mankato Area Planning Organization (MAPO) and the Minnesota Department of Transportation (MnDOT) District 7 to develop a comprehensive plan for future corridor investments. Portions of the corridor have been studied througout the past two decades, but questions remain regarding operational and safety needs from County Road (CR) 120 to the Blue Earth River crossing, pedestrian connections across Highway 169 throughout the corridor, access to businesses along the corridor, and operational and safety needs between the Veterans Memorial Bridge and Lake Street, including the Highway 169/14 interchange.

Improvements such as turn lanes, acceleration lanes, pedestrian crossing enhancements, trail connections, and frontage road improvements have resulted, yet a few key concerns remain:

1. Operational and safety concerns from County Road 120 to the Blue Earth River Crossing
2. Pedestrian and bicycle connectivity across Highway 169 throughout the corridor
3. Maintaining access to area businesses
4. Maintaining emergency access
5. Operational and safety concerns between Veterans Memorial Bridge and Lake Street, including the Highway 169/14 interchange
6. Maintaining economically viable access to business and property owners near Lind Street (per City of Mankato Resolution No. R-19-0708-119)
7. Maintaining full access at Webster Avenue; if Webster Avenue is to be relocated, it must:
    a. Provide economically viable and safe access for all existing businesses in the corridor
    b. Remain within the boundaries (present or expanded) of the City of North Mankato
    c. Include an area that is economically viable and feasible for redevelopment and reinvestment
    d. Provide a safe outlet for residents in Lower North Mankato, and that access point must be within the municipal boundaries (present or expanded) of North Mankato (per City of North Mankato Resolution No. 53-19).

The Highway 14 south exit ramp currently has some safety and operational issues.

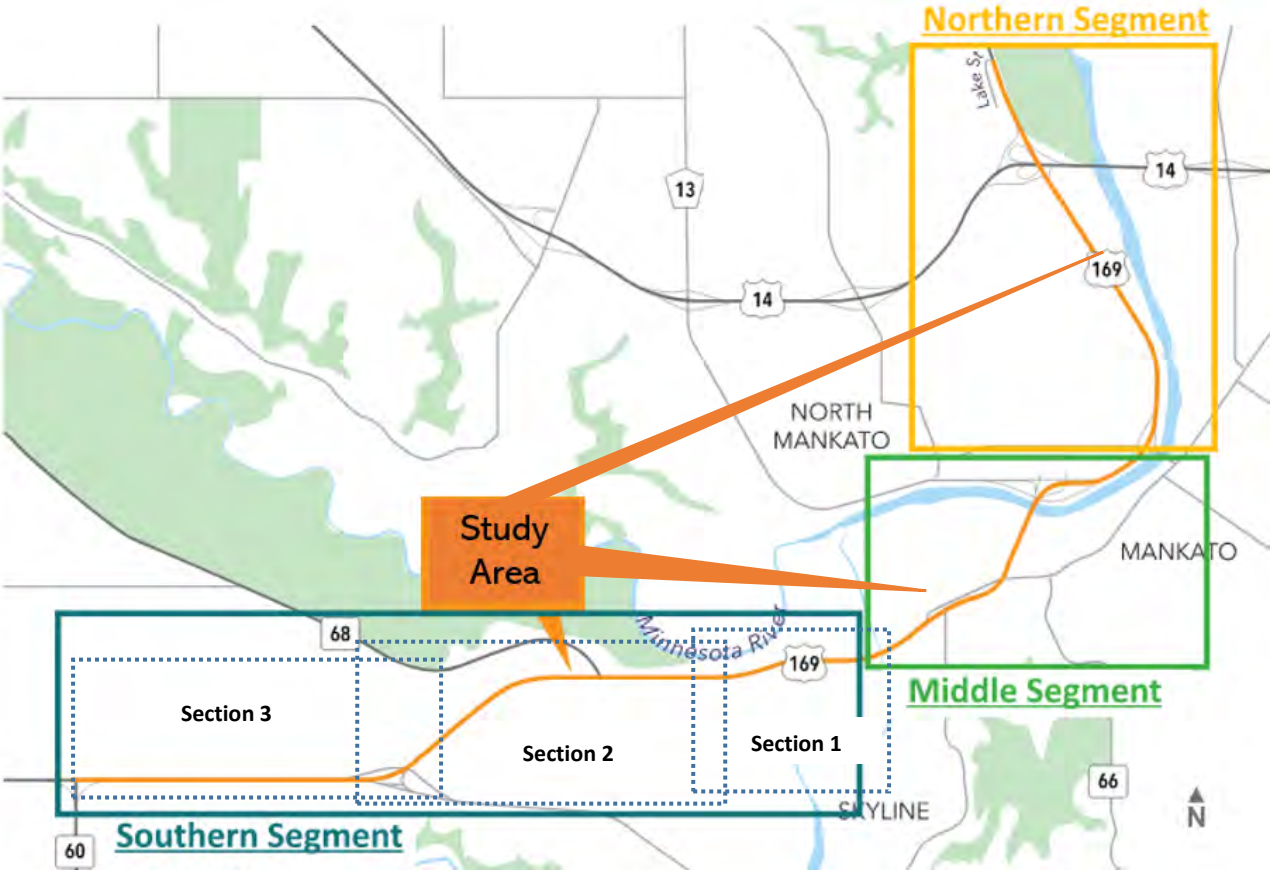
Both the City of Mankato and City of North Mankato passed resolutions stipulating their consent to the Corridor Study in July 2019. Both resolutions are included in **Attachment A.**

The study sought to understand the needs and opportunities in the corridor; establish purpose and need, and goals and objectives; develop and evaluate improvements; reach consensus on a vision; and develop an implementation plan that defines improvement triggers and allows the vision to be achieved in increments. This process allowed an aligned vision that blends and balances competing interests like mobility, access, and economic needs. The Highway 169 implementation plan will guide future planning and programming of land use/economic development opportunities, bridge improvements, and operational and safety enhancements for all modes of travel.

The study area extents included Lake Street at the north and Highway 60 at the south as shown in Figure 1. For ease in describing key corridor/network needs, the study area was split into three

subareas based on the unique context within each. The northern, middle, and southern subareas and for the same reasons the southern subarea was split into three sections. The subareas are also shown in **Figure 1**.

Figure 1. Study Extents and Subareas



1. Study Area Importance

The corridor provides a range of services to a diverse user base serving both regional travel and local community access. This section describes both of the highway's important functions.

Regional Multimodal Corridor

Located in south central Minnesota, the Mankato/North Mankato metropolitan planning area is 75 miles south of Minneapolis-St. Paul at the junction of Highway 14 and Highway 169. The area has experienced widespread growth across the metropolitan area and serves southern Minnesota as a hub for health care, education, retail, agriculture, and industry.

View south towards the Blue Earth River. Highway 169 provides regional access to health care, education, retail, agriculture, and industry.

Highway 169 is the primary transportation corridor for funneling freight into the Twin Cities from the Mankato/North Mankato region and southern Minnesota. This area produces almost half of Minnesota's corn, soybeans and ethanol, making Minnesota third in the nation for production among all states. Other major commodities moving along this corridor include aggregates, clay and sand, hogs, manufactured goods and food products. Other key freight attributes of the Highway 169 corridor between Mankato and the Twin Cities include:

- Moves the equivalent of 30,000 tons of freight by truck per day with an average daily vehicle count of 1,200 – 3,700 heavy commercial vehicles.
- Carries the fifth heaviest freight volume of any highway in Minnesota – the top four are I-94, I-90, I-35 and MN 52.
- Connects major producers of ethanol, biodiesel, and other byproducts to markets and refiners along MN 60 and the adjacent Union Pacific Railroad.
- Provides one of two major conduits to the Ports of Savage for grain exports via the Minnesota and Mississippi River systems.

The corridor serves an integral role as a provider of localized transportation and access. StreetLight Insight© was used to analyze origin-destination information. This information was used to determine the main travel patterns and understand what percent of the traffic along Highway 169 is local verses regional.

Figure 2 illustrates the results of the origin-destination analysis. This shows nearly half of all traffic on Hwy 169 is traveling to Mankato and nearly ¼ of traffic is traveling to North Mankato. The majority of freight traffic is destined for Blue Earth, Watonwan, Nicollet, Nobles, Scott and Cottonwood Counties.

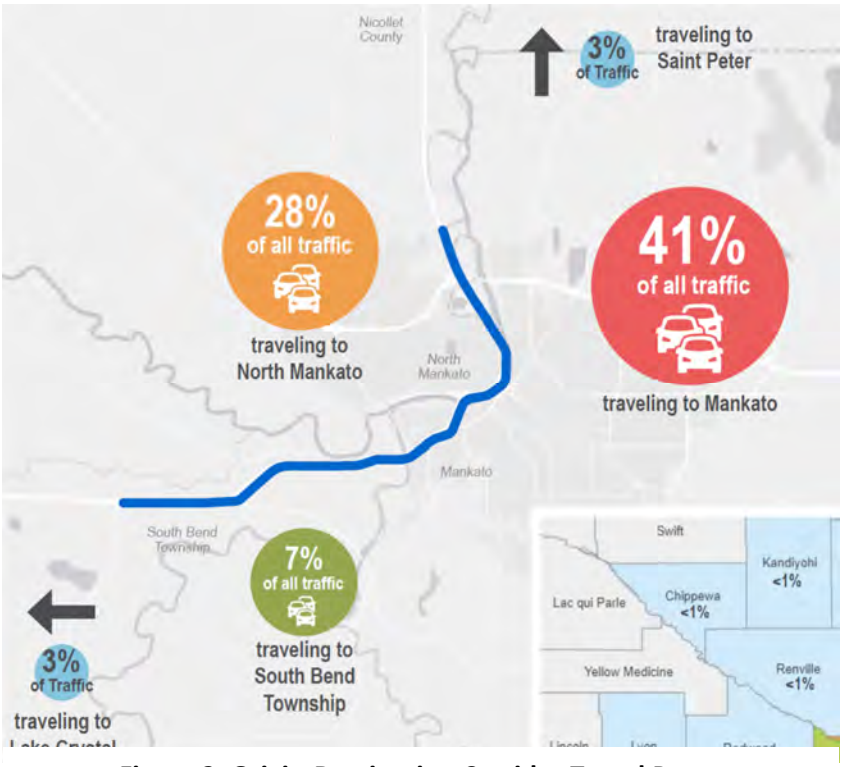


Figure 2. Origin-Destination Corridor Travel Patterns

2. Priority in MAPO 2045 Long Range Transportation Plan (LRTP)

The MAPO LRTP includes a recommendation to conduct this Highway 169 Corridor Study and outlines several important needs. The LRTP states, "Another high-density area is the Hwy 14 and Hwy 169 interchange which recorded over 200 crashes during the study period. These locations, among others, will be considered for recommendation of future projects to improve the safety of users." The LRTP also lists Highway 169 from US 14 to Webster Avenue as a future congested roadway segment with projected Level of Service E (pg. 35 of the LRTP). The LRTP lists Hwy 169 as a key piece of transportation infrastructure within the area evacuation footprint.

3. Study Objectives

Study partners desired to define an ultimate vision for the corridor that is context-sensitive and supported by local stakeholders. The study objectives included:

a. Analyze existing and future conditions
b. Develop purpose and need and evaluation criteria
c. Explore and evaluate all reasonable improvement concepts
d. Conduct public engagement to determine priorities and work towards consensus
e. Recommend a locally recommended corridor vision
f. Develop an implementation plan

While the intent of a corridor study is to determine an ultimate vision, there is inherent flexibility built into the vision. The value of the corridor study comes from identifying and agreeing upon the needs and deficiencies to be solved and then evaluating a range of improvement options. The goal is not to select a single preferred alternative but rather to dismiss options that do not meet the

purpose and need, leaving flexibility in a range of options making up the ultimate vision. The vision and its components can then be picked up for future consideration when project funding and required environmental review processes are identified.

The term "locally recommended vision" is used throughout this report to represent the ultimate vision recommended and supported by the full PMT – Mankato, North Mankato, Blue Earth County, Nicollet County, and MnDOT District 7. Additional design, study, and public discussion will be needed to move the components of the locally recommended vision forward into detailed design and environmental review. At that time, a preferred alternative for each improvement area will be identified consistent with the requirements and process of the National Environmental Policy Act (NEPA) and/or Minnesota Environmental Policy Act (MEPA). The analysis and documentation of the corridor study was done to allow for a seamless transition into the future phases of project development for corridor improvements. This report and its many attachments with technical memorandums will serves agencies well in the future transition of this from study phase to implementation of individual projects.

4. Purpose of the remainder of the report

The remainder of the study report is organized into sections to provide context on the study background and purpose, agencies involved, key transportation issues, purpose and need, improvement options, recommendations, and an implementation plan.

III. Study Partners

The Highway 169 Corridor Study was a joint effort between:

- MAPO
- MnDOT
- City of Mankato
- City of North Mankato
- Blue Earth County
- Nicollet County

These agencies served as a Project Management Team (PMT) and met monthly throughout the study process to review and discuss study progress and technical deliverables and to make study recommendations.

IV. Public Involvement

The Highway 169 Corridor Study was initiated before, and was conducted throughout, a global pandemic caused by COVID-19. The PMT held numerous critical discussions regarding how to best adapt to these dynamic circumstances and to ensure the study continued in a manner that was both accessible to all and abided by public health guidance. Study methods were adjusted in numerous ways to ensure a continued comprehensive public engagement. To ensure conformance with public health guidelines, numerous stakeholder and public meetings were pivoted from in-person meetings to virtual meetings held online accessible via the internet and telephone. The PMT also took actions to overcome the "digital divide" and ensure access to all study materials to all requesting persons without internet and/or telephone access. In addition to a menu of electronic options, copies of all engagement materials were available in hard copy upon request, and comments were accepted via U.S. mail and a contact-free drop box outside MAPO offices.

The Highway 169 Corridor Study included a broad and robust public involvement element. Input was sought, collected, and analyzed from a wide variety of stakeholders including business owners, property owners, interested citizens, elected officials, and agency staff. Stakeholder input was crucial throughout

all phases of the study and helped understand issues and to vet improvement concepts and priorities. Public engagement materials were available upon request via U.S. mail and in-person at MAPO offices to bridge the "digital divide" for persons unable to access materials via the internet. A full report of public and stakeholder engagement can be found in the Public Engagement Summaries (**Attachment E**). The following methods were used to engage the public and other stakeholders throughout the study:

1. **Focus groups**

   A series of focus groups were held over the course of the study to collect feedback from businesses adjacent to the corridor. The focus groups were organized by business location based on the three corridor subareas (i.e., north, middle, and south). Businesses were invited through direct mail, email, and phone calls. The first series of focus group meetings were held in the existing conditions phase of study to confirm and identify additional needs and opportunities in the corridor. The second series of focus group meetings were held in the concept identification and evaluation phase of study to gather input on the range of improvement concepts and initial evaluation results.

2. **Virtual public meetings/open houses**

   Three virtual public meetings/open houses were held. The first was held during the early phases of the study to solicit input on issues, needs, and opportunities along the corridor considering safety and crash issues, local economic vitality, traffic operations, existing accesses, and future land use within the study area. The second meeting was held during the mid-point of the study and solicited public input on draft improvement concepts and evaluation ratings. The third and final meeting was held during the final phases and focused on refining and clarifying public preferences, preliminary recommendations, and prioritization for future implementation.

3. **Online open house (interactive website)**

   To better accommodate public safety guidance and attendee schedules, three multi-week virtual open houses were held. Open houses were accessible 24 hours per day, seven days per week and provided materials reflecting study progress and soliciting input. Recordings of the virtual open house presentations were made available along with a means to collect public input through an online comment map. In addition, all materials were available upon request via U.S. mail and in person at MAPO offices.

Songs on the Lawn pop up event in Mankato.

4. **Pop up events**

   MAPO and agency staff traveled to public events and engaged directly with attendees to introduce the study, collect public input, and provide information on how to stay engaged. Two pop-up events were held during the second phase of study to collect public input on the range of improvement concepts and initial evaluation ratings.

Farmers Market pop up event in North Mankato

5. **Additional freight stakeholders' engagement**

   Direct outreach was performed to regional freight stakeholders. A targeted list of over 70 freight stakeholders was notified about the study, provided educational and engagement information, and invited to speak with study managers.

6. **City Council, County Board, and MAPO Board presentations**

   Study staff met with the governing bodies of project partners, including the Councils of the cities of North Mankato and Mankato, the Boards of Nicollet and Blue Earth County, and the MAPO Technical Advisory Committee and Policy Board. Study staff also met with MnDOT District 7 project managers to review the study progress and gather input on the range of concepts and study recommendations.

7. **Methods for public notifications**

   Methods of public notification included news releases to area print, television, and radio outlets, project partner social media, targeted post card mailing, news stories, and flyers. Project staff coordinated with Greater Mankato Growth and the Mankato City Center Partnership.

V. Existing Conditions

This section contains analysis of the existing conditions within the study corridor. The existing conditions analysis covers the current policy environment, the findings of previous studies, area demographics, network utilization, study area characteristics, and opportunities, deficiencies and needs within the study corridor.

1. **Previous Studies and Guiding Documents**

   Several studies and guiding documents have been completed/adopted which provide direction for future transportation needs within and around Highway 169. The key points in each study relevant to the Highway 169 area are summarized below by plan title.

MAPO 2045 LRTP Update (November 2020)

The Mankato/North Mankato Area Planning Organization's (MAPO) Long Range Transportation Plan (LRTP) Update, guided by MAPO's Technical Advisory Committee (TAC) and Policy Board was published in 2020 to share long-range and short-range transportation planning strategies and actions that contribute to the development of an integrated multimodal transportation system with the capacity to facilitate the safe and efficient movement of people and goods. The geographic extent of the plan included Blue Earth and Nicollet counties; the cities of Mankato, North Mankato, Eagle Lake, and Skyline; and the townships of Belgrade, Lime, South Bend, Le Ray and Mankato. All member jurisdictions were included in the development of the plan. The following provides a summary of findings from this study:

- A system management and preservation approach should be applied to preserve the principal arterial system, extend the capacity of current transportation facilities, and maximize highway efficiency.
- Identified Downtown (Civic Center) Mankato, Mankato West High School, Mankato City Hall/Government Center, Minnesota State University as high-risk emergency and disaster response areas adjacent the Highway 169 corridor
- The Highway 169 and Highway 14 Interchange is an issue area with crash rates exceeding critical thresholds, intersection and corridor deficiency, and access spacing less than minimum requirements.
  - An intersection operations analysis found that high mainline speeds, in combination with significant southbound traffic volumes, limit the availability of acceptable gaps for eastbound left-turning motorists, causing significant side-street delays (LOS F) and queues at the Highway 169/Highway 14 South Ramp intersection
  - Identified crash types at the south ramp intersection were rear-end crashes at side-street stop control intersection

    - Potential improvements include installation of a warning sign, traffic control improvement, interchange reconfiguration and access modifications
- The Highway 169 and Lind Street intersection exceeds calculated critical rates
    - Identified crash types were rear-end crashes at a signalized intersection
    - Potential casual crash factors included large turning movement volumes and inadequate signal timing
    - Potential improvements including a traffic control improvement, re-timing of the signal, interchange reconfiguration and access modification
- The Highway 169 from Highway 14 South Ramp to Webster Avenue exceeds the typical crash rate but does not exceed the calculated critical rate
    - Identified crash types include rear-end crashes
    - Potential casual factors include excessive speeds, significant queues, large turning movement volumes, and inadequate signal timing
    - Potential improvements including reduced speed limit with enforcement, re-time signals, interchange reconfiguration and access modifications
- Includes five design concepts reviewed by MnDOT and previous MATAPS efforts at the Highway 169 and Highway 14 interchange
- Includes several other low-cost/high-benefit solutions along the Highway 169 corridor for access control and traffic signal management

City of Mankato Riverfront Drive Corridor Study (June 2017)

In June 2017, the Mankato/North Mankato Area Planning Organization (MAPO) published the Riverfront Drive Corridor Study which identified a long-term vision for multimodal improvements on Riverfront Drive to help address pedestrian safety, speed issues, and freight and local access for businesses along the corridor. The study was led by MAPO and the City of Mankato. The study extent included Riverfront Drive from Woodland Avenue on the south to Highway 14 on the north.

The study partners desired to define a comprehensive vision for Riverfront Drive to continue their momentum in City Center reinvestment while also serving continued growth and local/regional mobility needs over the next 25 years. The study included defining the issues and potential opportunities along the corridor, establishing the corridor vision and goals, developing and evaluating potential multimodal infrastructure improvement concepts, and developing a short- and long-term implementation plan that identifies potential projects and cost estimates.

The study included the following findings and recommendations relevant to the Highway 169 corridor.

- Peak hour queuing at the Riverfront Drive/Highway 169 interchange from both northbound and southbound directions.
- Improvements at the southbound Riverfront Drive/Highway 169 interchange ramp and additional turn lanes and access configurations between the interchange and Stoltzman Road.

Belgrade Avenue Corridor Study (July 2017)

In July 2017, the Mankato/North Mankato Area Planning Organization (MAPO) and the City of North Mankato completed the Belgrade Avenue Corridor Study to identify a long-term vision for multimodal improvements on Belgrade Avenue in North Mankato. The study extent included Belgrade Avenue from Lee Boulevard on the west to the Veteran's Memorial Bridge on the east. The study defines a comprehensive vision for Belgrade Avenue to understand the needs and opportunities in the corridor, develop and evaluate potential transportation improvement concepts, and develop an implementation plan that prioritizes projects for completion over time. The study included the following findings and recommendations ranging from short- to long-term for five focus areas along the corridor relevant to the Highway 169 corridor:

- Highway 169 Southbound Ramp Intersection: construct a roundabout for traffic calming Further analysis was underway at the time to evaluate the viability of a roundabout or traffic signal control at the intersection.

MAPO ADA Transition Plan (May 2019)

The Mankato/North Mankato Area Planning Organization (MAPO) ADA – Transition Plan & Inventory for Public Right-of-Way was published in May 2019 as part of requirements laid out in the Americans with Disabilities Act (ADA). The ADA requires MAPO and partner agencies to conduct self-evaluations of facilities within public rights-of-way and develop a transition plan detailing how the agency will ensure all facilities are accessible to all individuals. The study includes evaluations of MAPO member jurisdictions including Blue Earth and Nicollet counties and the cities of Mankato, North Mankato, Eagle Lake, and Skyline.

Implementation of the plan was separated into priority levels ranging from high priority to low priority. MAPO partner agencies used the priority ranking outlined above to create the plan and schedule for integrating ADA compliance projects in future streets projects. Each agency utilized two methods for upgrading pedestrian facilities to the current ADA standards. The first is the scheduled street and utility improvement projects. All pedestrian facilities impacted by these projects were recommended to be upgraded to current ADA accessibility standards. The second method is the stand-alone sidewalk and ADA accessibility improvement project. These projects were recommended to be incorporated into the Capital Improvement Program (CIP) on a case by case basis as determined by agency staff. The study found that the following sidewalks, pedestrian ramps, bus stops, and traffic signals along the Highway 169 corridor were not compliant with ADA accessibility standards:

- Priority area at Highway 169 and Kiwanis Recreation Area
- Eight not compliant pedestrian ramps at W Lind Street & Highway 169
- Priority area at County Road (CR) 33 and Highway 169
- Two sidewalk barriers at S Riverfront Drive & Highway 169
- Six not compliant pedestrian ramps at S Riverfront Drive & Highway 169
- Three sidewalk barriers at Highway 169 and the Blue Earth River Crossing
- The intersection of Highway 169 & Lookout Drive lacks accessible pedestrian signals (APS) and has non-ADA compliant pedestrian ramps.
- Two not compliant pedestrian ramps at Sherman Street & Highway 169
- One sidewalk barrier at Sherman Street & Highway 169
- Three not compliant pedestrian ramps at Center Street & Highway 169
- One not compliant pedestrian ramp at Belgrade Avenue & Highway 169

City of Mankato Transit Development Plan (June 2018)

In June 2018, the City of Mankato published the Mankato Transit Development Plan. This plan explores the community's vision for a future transit system that increases access and reliability, encourages ridership growth, and identifies additional opportunities for improvement in service and operations. The Mankato Transit System (MTS) serves 24 square miles in Mankato and North Mankato. In May 2018, MTS operated 19 fixed route bus line and paratransit service.

The planning process identified three service recommendation scenarios. The scenarios give MTS flexibility to begin addressing deficiencies in the existing system as funding becomes available.

- Cost neutral scenarios that maintain 2017 funding levels: removing deviations to increase travel time and reliability, transferring segments of routes to create more efficient connections, and realigning routes to adjust low performing routes

- New service expansion scenarios that add service funded by MnDOT grants: level of service improvements, route extensions to provide better connections to new and existing activity centers, and creating new routes to connect to new areas throughout the region
- Illustrative scenarios that include recommendations that address community feedback but are not yet funded: increased peak and all-day frequencies on existing routes, enhanced weekend service, extended weekday hours of service and new routes

The PMT maintained considerations to transit needs at all stages of the study. As the Mankato Transit System (MTS) provides services to both Mankato and North Mankato, it is anticipated that Highway 169 will play a role in future operations. Future transit services utilizing Highway 169 may include fixed route, demand response, and ADA/paratransit.

City of Mankato Riverside North Redevelopment (October 2020)

The City of Mankato undertook an update to the plan for the Riverside North Redevelopment, adopted by the Council in the 1980's. The Riverside North Project area consists of approximately 24 acres located in the northwest section of the city. The area lies between Highway 169 and the Minnesota River, immediately south of Highway 14. The entire western side of the project area fronts on Highway 169. The update included an area investigation/market analysis, land use/redevelopment scenarios, and a small area plan. The plan included public engagement with the Mankato property owners/residents. The scope of the plan was only for areas along the corridor within the City of Mankato.

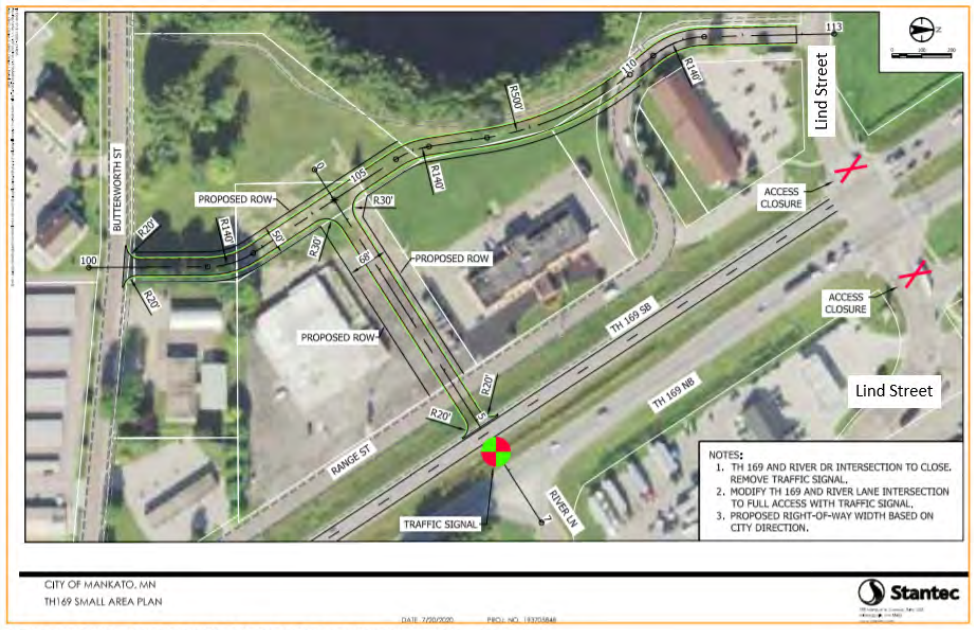


FIGURE 3.2 FULL ACCESS INTERSECTION AT NORTH RIVER LANE - OPTION 2

Image from City of Mankato Riverside North Redevelopment Plan, pg. 21

The Riverside North Redevelopment Plan includes acknowledgement of the 169 Corridor Study, which was developed over an overlapping timeframe. The plan states, *"A key aspect of the Highway 169 Corridor Study is the decisions that are made about future access to the study area from Highway 169. MnDOT expressed in 1996 when Lind Street was originally signalized that access to the study area from Lind Street will likely be fully or partially closed, because of the proximity of that full access intersection to the highway interchange. The location and quality of new access to the study area is an important decision that will impact existing businesses and residents in the study area, as well as the market viability of future development. A decision about the location and type of intersection control of a future*

access point will emerge from the Highway 169 Corridor Study, and be informed by consultation with MAPO, public and stakeholder engagement, and as well as engineering and safety considerations."

The Riverside North Redevelopment Plan recognizes the forthcoming closure of Lind Street and recommends that access to the study area be relocated as close as possible, stating, *"A key overarching priority is ensuring that high quality access to the Study Area is reestablished upon closure of Lind Street. Building a full access intersection as close as possible to Lind Street is a key to maintaining the viability of some of the existing businesses in the study area, as well as creating the opportunity for new development and investment in the area."*

City of North Mankato Webster Avenue Area Plan (June 2021)

This study covers the primarily industrial and commercial area along and around Webster Avenue in North Mankato between Highway 169 and Lake Street. Webster Avenue serves as a gateway to the City of North Mankato, providing access to a thriving commercial/industrial zone, area recreation, and residential neighborhoods in the area known collectively as Lower North Mankato. Businesses surrounding Webster Avenue rely on connections to US Highway 169 as many are oriented around the sale or maintenance of trucks and deliveries. Webster Avenue connects to US Highway 169 with an at-grade, full movement intersection today and is also near US Highway 14, providing vital regional connectivity.

Image from City of North Mankato Webster Avenue Area Plan, pg. 19

As changes continue to develop across the North Mankato and Mankato region, the City of North Mankato is working to develop a vision for Webster Avenue to guide redevelopment and revitalization of the area. This study was intended to inform the MnDOT Highway 169 study by defining a vision of the Webster Avenue area that has the combined support of the City and area citizens, businesses, and property owners.

Webster Avenue handles a mix of vehicular traffic from tractor-trailer and large freight trucks down to passenger cars. Between 2011 and 2015, eight crashes occurred at the intersection of Webster and Range Street. The intersection receives traffic from Highway 169 and descends in elevation to the lower Webster Avenue below. With Spring Lake Park on the western terminus, Webster must also accommodate pedestrian and bicycle traffic coming primarily from the residential area south of the roadway. Access to the Webster Area is largely provided by the Webster Avenue and Highway 169 intersection. Each roadway within the industrial district feeds to Webster Avenue, with Cross Street and Range Street providing north/south through access along the area's eastern edge. Each north/south roadway also provides access to residential areas south of Webster Avenue.

The Webster Avenue Area Plan includes the below bulleted recommendations:

Goals and objectives of the study include:

- Direct Highway 169 access. Businesses expressed heavy reliance on Webster Avenue access to Highway 169 for the servicing of trucks, sales of trailers and parts to trucking customers, and shipments and deliveries by truck as the basis for their businesses. As such, most respondents agree that sustained direct access is vital to the continuation of their businesses and that loss of access would result in detrimental effects, including possible business closure.
- Continue to work with the Highway 169 Study Team and area stakeholders to outline a future for the Webster/Highway 169 intersection, while ensuring continued regional access to Webster Avenue from the highway.
- Coordinated wayfinding signage on Highway 169 and Webster Avenue to remove confusion for truck drivers finding their business.

City of North Mankato Comprehensive Plan (2015)

The Comprehensive Plan is a vision and roadmap for where the City of North Mankato is headed. The ideas and goals expressed in this plan are intended to reflect the community's values and the desire for what North Mankato is to become. The planning process identified the following as it pertains to Highway 169:

- The Land Use chapter gave recognition that Webster Avenue and Highway 169 is an area that people first see as they come into North Mankato and provide visitors with their first impression of the community. Webster Avenue has an opportunity to create a gateway into the community and let visitors know they are in North Mankato and will contribute to the creation of a "sense of place".
- The Transportation Plan provides information about previous planning efforts through the 2011 Mankato/North Mankato Area Transportation Planning Study (MATAPS) in which it identified; existing and potential deficiencies of the arterial-collector street system, the functional hierarchy of streets and roads related to access and capacity requirements, access management policies and intersection controls, and future planning through the Mankato/North Mankato Area Planning Organization's (MAPO) 2045 Long Range Transportation Plan.
- The Mankato Area Transportation and Planning Study (MATAPS), completed in 2011, included a comprehensive technical analysis and public outreach effort to identify transportation issues for the MATAPS area. The following major issues were identified specific to North Mankato and Highway 169:
    - Highway 14/Highway 169 interchange – safety and connectivity concern (eastbound on Highway 14 to northbound Highway 169); high-crash location
    - Highway 169 at Lind Street and Webster Avenue – local access and safety concerns
    - Trail expansion – potential trail expansion through the MATAPS study area and MAPO's Long Range
- The large vacant parcel at the northwest quadrant of the Highway 169/West Lind Street intersection lies within the City of Mankato and is designated for heavy industrial development on their land use map. The City of Mankato has also received inquiries from potential developers regarding the possibility of a large retail development being located on this site. Either an industrial or commercial/retail development could result in traffic impacts on the North Mankato local street system, namely West Lind Street and North Lake Street. Lake Street north of Webster Avenue is designated as a local street in the proposed functional classification. It is the intent of the City of

North Mankato that this segment of Lake Street remains a low-volume local street to preserve the unique character of the street corridor and the adjacent residential properties.

- Several scenarios for modification to the Highway 169 and Highway 14 interchange and for access modification to the segment of Highway 169 from Highway 14 interchange to Webster Avenue have been developed in the past. The primary objectives of the proposed improvements for the interchange are to eliminate the need to cross lanes of traffic when making the following turning movements; eastbound Highway 14 to northbound Highway 169, northbound Highway 169 to westbound Highway 14. Most of the improvement scenarios also included modification to the existing access conditions at the Lind Street and/or Webster Avenue intersections. Options considered included the removal of signals, closing access completely, or modifying access to right in/right out at one or both locations. During the last MATAPS updates in 2003 and 2011, the City of North Mankato staff and Council voiced opposition to any option that eliminated or reduced the level of access at Webster Avenue. Based on discussions with City staff and City Council, the position of the City of North Mankato has not changed on this issue. The City will not support options for improvements within this corridor that restrict access at the Highway 169/Webster Avenue intersection from today's full access condition. See the City of North Mankato Resolution No. 53-19 below for conditions regarding any option that includes relocating the Webster Avenue intersection.
- A policy relating to Highway 169 was listed in the Transportation System Goals, Objectives, and Policies, states that full access conditions be maintained at the Webster Avenue/Highway 14 intersection.

City of North Mankato Resolution No. 53-19 (adopted July 2019)

The City of North Mankato resolution No. 53-19 stated the following:

- In 1996, area government decided that an area transportation plan was needed. This resulted in a coordinated effort to produce the Mankato Area Transportation & Planning Study (MATAPS); and
- An update of MATAPS was completed in 2003 and 2012; and
- A reoccurring component of MATAPS was Highway 169 corridor improvements; and
- The Mankato/North Mankato Area Planning Organization Policy Board (MAPO) budgeted funds for the Highway 169 Corridor Study from Lake Street Northwest to State Highway 60 to be completed in 2019; and
- The proceeding with corridor studies requires a resolution of consent from local governments included in the study; and
- A critical intersection along the Highway 169 Corridor is at Webster Avenue where many North Mankato businesses rely on unrestricted access and turning movements on and off Highway 169; and
- In 2017, the City of North Mankato held business engagement meetings with area businesses to discuss the importance of the Highway 169 and Webster Avenue intersection; and
- It was evident that all participating area businesses believe that both north and southbound access from Webster Avenue to Highway 169 is critical; and
- The official position of the City of North Mankato is Webster Avenue shall remain open as a full access intersection with no restriction on turning movements and this has been North Mankato's position for over twenty years; and
- Webster Avenue is a critical full access intersection for both transportation and emergency response in Lower North Mankato; and
- The North Mankato City Council supports the inclusion of a Highway 169 Corridor Study in the 2019 MAPO work plan subject to the following condition:

    - The study will include maintain a full access intersection at Webster Avenue that is supported by the City of North Mankato
- If the study includes an option for relocating the Webster Avenue intersection, North Mankato's support for the recommendations is conditioned on the following:
    - All existing businesses in the corridor are provided with an economically viable and safe access.
    - Any new proposed location of the Webster Avenue intersection must remain within the boundaries (present or expanded) of the City of North Mankato.
    - Any new proposed location for the Webster Avenue intersection must include an area that is economically viable and feasible for redevelopment and reinvestment.
    - Any new proposed location of the Webster Avenue intersection must include a safe outlet for residents in Lower North Mankato, and that access point must be within the municipal boundaries (present or expanded) of North Mankato.

City of Mankato Strategic Plan (through 2023)

The City of Mankato Strategic Plan through 2023 acts as a guiding document for the City as it updates its services and initiatives. The plan outlines challenges and strategies intended to improve affordability, stewardship, and community building in Mankato. To increase transportation options and access for residents, the City plans to provide and promote affordable multi-modal transportation involving public and private partnerships and examine non-traditional modes and land use decisions that positively impact availability and feasibility. The following initiatives will be used to achieve these goals:

- Create opportunities for affordable transportation choices by developing an actionable multimodal plan and expanding the complete streets plan for bike/pedestrian connections.
- Establish innovative partnerships for expanded transit services by developing public/private partnerships to improve fixed route transit services in the City.
- Develop a transportation hub for local and regional connections and neighborhood transit stop locations that have passenger support elements.
- Apply transit supportive design by developing land use standards that encourage and support transit routes, such as high-density residential centers throughout the community.

City of Mankato Resolution No. R-19-0708-119 (adopted July 2019)

The City of Mankato resolution No. R-19-0708-119 stated the following:

- In 1996, a Highway 169 Corridor Plan was developed under the Mankato Area Transportation & Planning Study (MATPS) process; and
- The City of Mankato facilitated certain local road improvements, connections, and aspects of the MATAPS plan; and
- Subsequent updates to the MATAPS plan were made in 2003, and again in 2010; and
- The public engagement process identified concerns on the part of Mankato property owners along the corridor that any closure and subsequent relocation of the Lind Street access to be done in a manner that assures long-term economic vitality of the businesses and properties serviced by the Lind Street access; and
- The Highway 14/Highway 169 interchange is inadequate, and in particular, the turning movements from North Mankato Highway 14 to the Highway 169 ramp are in need of critical safety and operational improvements; and
- It is imperative that the corridor plan be prepared and included in the revised 10-year Long Range Transportation Plan for MnDOT District 7, so as to assure effective reinvestment of future state transportation funding and securing federal funding opportunities.

- The City Council for the City of Mankato that participation is authorized in the Highway 169 Joint Corridor Study provided that any concepts which include the closure and relocation of Lind Street remain economically viable to the affected businesses and property owners within the City of Mankato
- The City of Mankato retains its rights of municipal consent over local street closures and access relocations identified through the Highway 169 Corridor Study process.

2. Demographics and Trends

This section provides an overview of past and projected demographics in the study area, to demonstrate how growth has and will impact demand for transportation facilities.

Population and Households

The Mankato/North Mankato area has experienced steady growth since 2000. The MAPO area had an estimated population of 62,578 in 2012 and 65,175 in 2020, increasing 4%. Based on forecasts by MAPO the 2045 population is projected to be approximately 73,200, increasing an additional 12% from the 2020 estimation. **Table 1** details population, households and employment trends for the MAPO area.

Rapid growth, such as that seen in the MAPO area has implications on transportation systems. Fast growth may increase demand for roadway capacity and lead to greater density to support increased transit or bicycle/pedestrian facilities. In addition, the study area corridors are also influenced by their travel sheds which go beyond the immediate study area. Further detail on this is provided in section VI Land Use and Major Traffic Generators. Travel sheds will be identified early in the study by analyzing traffic pattern data.

Table 1. MAPO – Population and Households

Category	2012	2020	2030	2045
Population[1]	62,578	65,175	68,400	73,200
Households[1]	24,235	26,800	30,300	34,300
Employment[2]	34,257	37,200	40,800	46,300

1 Extrapolated using year 2020 projections developed in the Mankato Area Housing Study Update
2 Extrapolated to correspond with MATAPS 2010-year 2035 employment projections
Source: MAPO 2045 Long Range Transportation Plan (LRTP) Update

Employment

The Minnesota Department of Employment and Economic Development (DEED) estimates approximately 59,399 jobs exist in the Cities of North Mankato and Mankato as of 2017. The average hourly earnings is $26.44/hour. The largest industries are manufacturing, health care and social assistance, and retail trade. 20.4% of workers are employed in the manufacturing industry which could mean an increased demand for highway efficiency.

Of these employees, the majority either drove alone or carpooled to work in 2017 (**Table 2**). This high reliance on driving single-occupancy vehicles could mean greater numbers of auto trips as population in the MAPO area increases, placing greater demand on the existing transportation infrastructure. Currently the average travel time for each jurisdiction is lower than the average travel time to work for Minnesota. The City of Mankato has the highest percentage of residents who use public transit to get to work, likely due to the level of availability of transit within Mankato serving more routes and destinations. This emphasizes the importance of multimodal transportation facilities.

Table 2. Means of Transportation to Work, 2017					
Age	**North Mankato**	**Nicollet County**	**Mankato**	**Blue Earth County**	**South Bend Township**
Drove Alone	84.8%	76.7%	79.5%	80.9%	85.1%
Carpooled	6.4%	7.8%	7.3%	7.6%	4.5%
Walked	3.7%	3.9%	5.3%	4.0%	2.2%
Transit	0.7%	0.5%	2.2%	1.5%	0.4%
Other Means	1.2%	1.1%	1.4%	1.0%	0.7%
Mean Travel Time to Work (minutes)	16.4	17.9	15.5	17.3	16.4

Source: US Census Bureau

Minority, Low-Income, and other Vulnerable Populations

The following section is a summary of findings from the Environmental Justice Analysis in **Appendix Attachment B (Appendix B).** The Highway 169 corridor is in Blue Earth and Nicollet Counties in Minnesota. The two counties combine for a population of 99,244. The corridor study area consists of census block groups that either fall significantly within 0.5 miles of the Highway 169 project corridor or is a key location just outside the 0.5-mile radius. There are 21 block groups in the Highway 169 analysis area which have a population of 30,797 people according to the 2017 American Community Survey 5-year Estimates (**Table 3**).

Table 3. Environmental Justice Populations in the Highway 169 Project Area

		Hwy 169 Project Area		Nicollet and Blue Earth Counties, MN	
		Count	Percent	Count	Percent
Race and ethnicity	Population	30,797	–	99,244	–
	White	27,691	90%	88,457	89%
	Minority population	3,548	12%	12,729	13%
	Hispanic or Latino	822	3%	3,562	4%
	African American	1,149	4%	3,141	3%
	Asian or Pacific Islander	442	1%	1,954	2%
	Two or more races	555	2%	1,806	2%
	Native American	66	0.2%	245	0.2%
	Some other race	72	0.2%	79	0.1%
Income	Population for whom poverty status is determined	30,420	–	93,466	–
	Income below 200% of the poverty level	8,510	28%	14,835	16%
Education	25 years and older	20,386	–	59,878	–
	Less than high school education	941	5%	3,525	6%
Language	5 years and older	28,781	–	93,641	–
	Speak English less than "very well"	387	1.3%	1,719	2%
	Speak Spanish	31	0.1%	705	0.8%
	Speak and other language	282	1%	466	0.5%
	Speak an Asian language	73	0.3%	457	0.5%
	Speak an Indo European language	1	0%	91	0.1%
Age	Population	30,797	–	99,244	–
	Under 5 years	2,016	7%	5,603	6%
	65 years and older	4,205	14%	13,384	13%
Housing	Households	12,729	–	38,220	–
	Owner occupied households	8,472	67%	25,066	66%
	Renter occupied households	4,257	33%	13,154	34%
Disability	Population for whom disability status is determined	35,555	–	98,443	–
	Population with a disability	3,792	11%	10,240	10%
Vehicles	Households	5,042	–	38,220	–
	No vehicle households	539	11%	2,654	7%

**Data from census tracts. All other data is from the block group level.*

Rental and Low-Income Housing

About 33% of the housing in the study area is renter occupied compared to 34% of the occupied housing in Nicollet and Blue Earth Counties.

The neighborhood north of where the Blue Earth River meets the Minnesota River has a high concentration of minority and low-income individuals and contains a number of large multi-unit housing including the Villa Terrace Apartments (1560 Tower Blvd), Hoover Estates Apartments (1866 Lee Blvd), Lee Estates Apartments (1740 Lee Blvd), Roe Crest Estate Apartments (1604 Roe Crest Drive), Colony Apartments (1621 Colony Ct), Allen Avenue Apartments (301 Allan Ave), and Village Court Apartments (1620 Village Ct), as well as several other smaller multi-unit buildings and

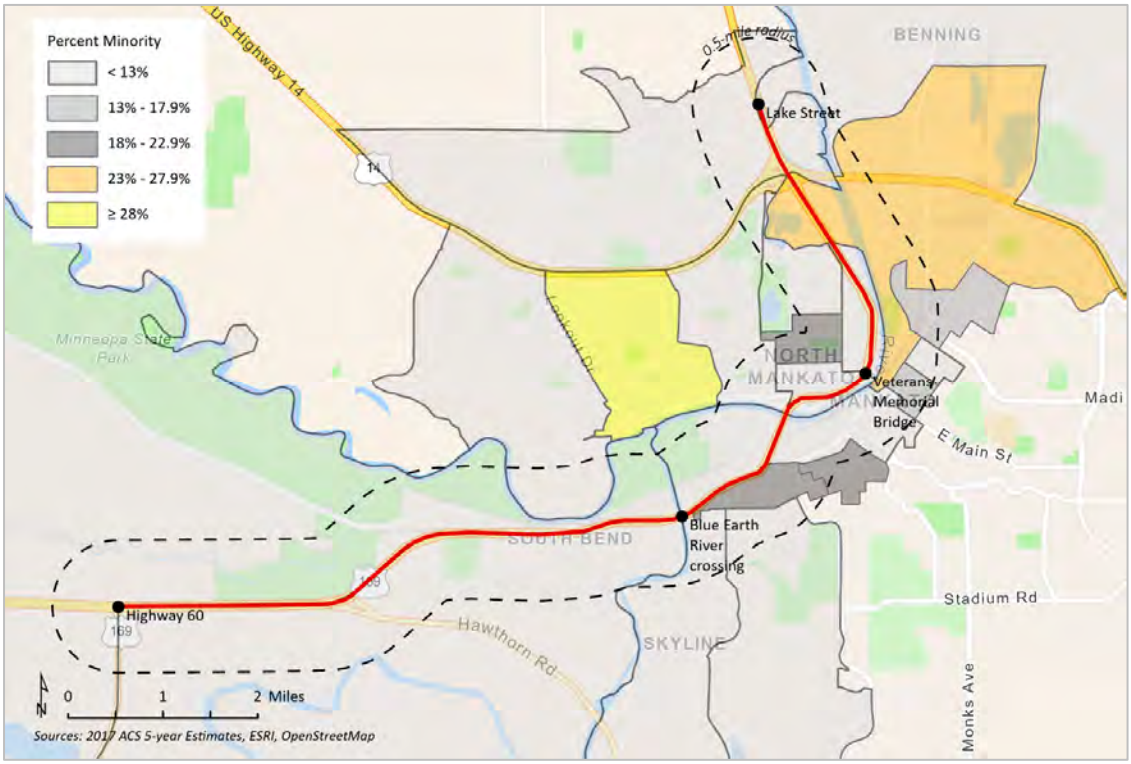
single family units. The area directly surrounding the Highway 14 intersection contains mostly businesses and the Kiwanis Recreation Area, with the notable exception of the Park Place Townhomes just south of Hiniker Pond (281 Butterworth Street).

Minority Populations

Minority populations includes individuals who identify as Hispanic or Latino, Black or African American, Asian American or Pacific Islander, Native American, some other race, or two or more races, as defined by the U.S. Census Bureau. There are two block groups above 23 percent minority populations that fall within the project area (**Figure 3**) and can be considered environmental justice populations.

The yellow block group north of the Minnesota River has the highest concentration of minority individuals in project area with 34 percent (**Figure 3**). The block group contains a number of large multi-unit dwellings as well as several other smaller multi-unit dwellings and single-family homes. The orange block group that crosses the segment between Lake Street and Veterans Memorial bridge south of Highway 14 has mostly businesses west of the Minnesota River, with the notable exception of the townhomes south of Hiniker Pond.

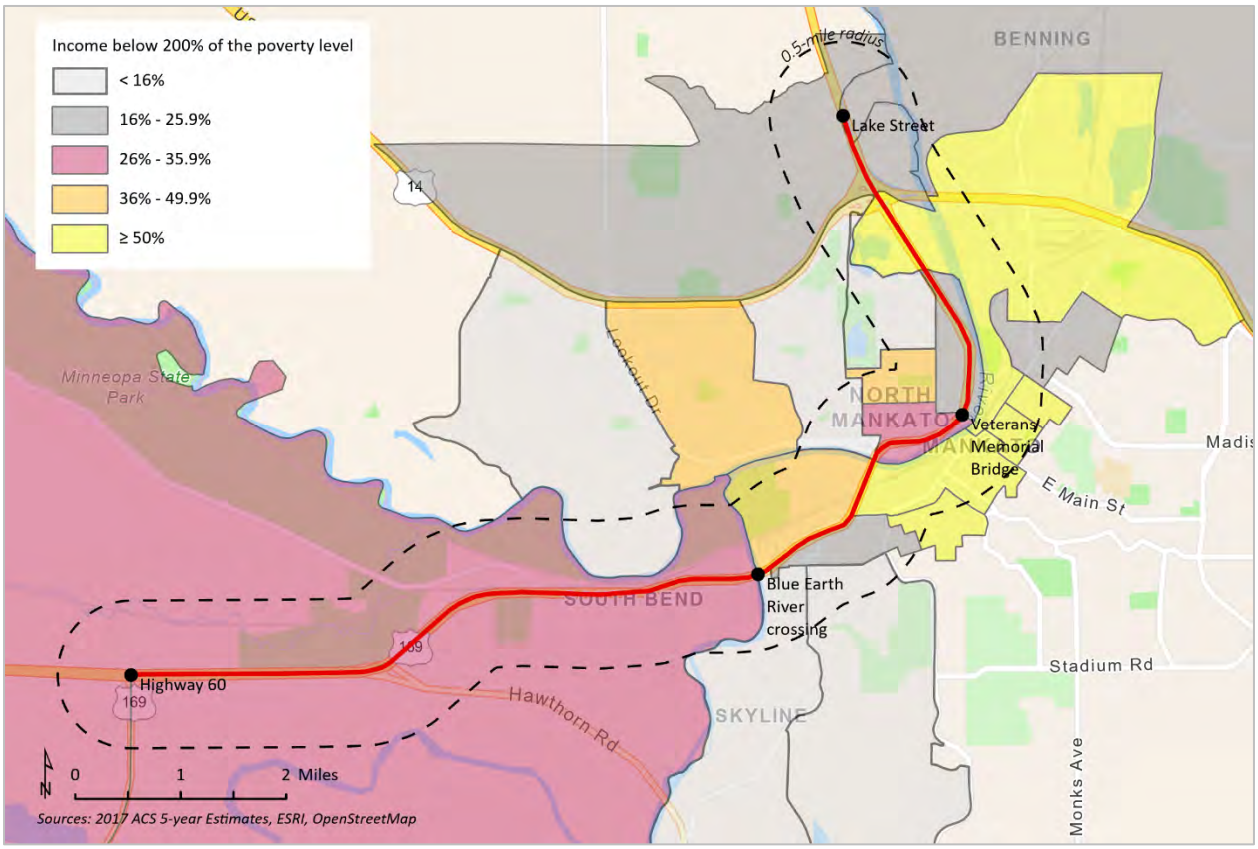
Figure 3. Percent of Minority Individuals by Block Group in the Hwy 169 Project Area



Low-Income Populations

A low-income population is defined as one where the block group contains a 10 percent higher concentration of low-income individuals than the county average. There are 11 block groups above 26 percent low-income populations that fall within the project area (**Figure 4**). The block groups range between 26 percent and 70 percent of populations that have low incomes. Due to the significantly greater low-income concentrations compared to the general population than the counties, all 11 block groups can be considered environmental justice populations.

Figure 4. Percent of Low-Income Individuals by Block Group in the Hwy 169 Project Area



Education

About 5% of the population aged 25 years or older living in the study area has less than a high school education compared to 6% for the overall populations of Nicollet and Blue Earth Counties.

Language

About 1% of the population living in the study area speaks a language other than English and speaks English less than "very well" compared to 2% for the overall populations of Nicollet and Blue Earth Counties. Of those people who speak English less than very well in the study area, most speak a language not identified in the ACS 5-year estimates (an "Other" language).

Age

The age distribution of a jurisdiction **(Table 4)** is important because it affects transportation usage. In 2017, the largest population group in the MAPO area was residents between 20-34 years old. A large portion of this age group lives in Mankato, partially due to theatta Minnesota State University Mankato campus, Bethany Lutheran Mankato Campus, and South Central North Mankato Campus.

About 7% of the population living in the study area is under 5 years old compared to 6% for the overall populations of Nicollet and Blue Earth Counties. South Bend Township and North Mankato have greater percentages of residents under 18 years old than the state of Minnesota or the rest of the MAPO area. This may mean greater demand for transportation concepts or safe routes to school programs. About 14% of the population living in the study area is 65 years and over compared to 13% for the overall populations of Nicollet and Blue Earth Counties. In South Bend Township, the percentage of residents over 65 years old is much higher than the rest of the MSA and State of Minnesota at 20.2%. This percentage indicates the importance of dial-a-ride transit services.

Table 4. Age Distribution, 2017						
Age	North Mankato	%	Mankato	%	South Bend Township	%
Under 5	903	7%	2,263	5%	124	7%
5-9	969	7%	1,912	5%	139	8%
10-14	868	6%	1,967	5%	175	10%
15-19	835	6%	4,350	11%	48	3%
20-24	611	4%	9,798	24%	67	4%
25-34	2,090	15%	5,842	14%	254	14%
35-44	1,716	13%	3,843	9%	203	11%
45-54	1,611	12%	3,212	8%	215	12%
55-59	1,030	8%	1,681	4%	129	7%
60-64	973	7%	1,844	4%	98	5%
65-74	1,038	8%	2,228	5%	114	6%
75-84	609	4%	1,546	4%	125	7%
85 and Over	330	2%	755	2%	129	7%
Total	13,583	100%	41,241	100%	1,820	100%
Median Age	38.0	NA	25.5	NA	40.6	NA
% Under 18	24.4%	NA	17.1%	NA	26.2%	NA
% Over 65	14.6%	NA	11.0%	NA	20.2%	NA

Source: US Census Bureau

Disability

Although not an EJ population, it is important to be aware of the people with disabilities in the project area. About 11% of the population for whom disability status is determined has a disability in the project area compared to 10% for the overall populations of Nicollet and Blue Earth Counties.

Household Without a Vehicle

Although not an EJ population, it is also important to be aware of the number of households in the project area without a vehicle. About 11% of households in the project area do not have a vehicle compared to 7% for the overall households in Nicollet and Blue Earth Counties. Staff will need to work with locals to identify how to best reach these households that live near the project area.

VI. Transportation System Characteristics

This section describes elements of the existing transportation network, information related to land use, traffic operations, safety, access, and non-motorized connections. This section concludes with a review of known social, economic, and environmental (SEE) resources considerations within the study area.

Functional Classification and Jurisdiction

The functional classification system is used to create a roadway network that efficiently collects and distributes traffic from neighborhoods to the state highway system. A successful system coordinates and manages mobility, roadway design, and route alignment as well as seeks to match current and future access and land use with the adjacent roadway's purpose, speeds, and spacing. The functional

classification system is comprised of principal arterials, minor arterials, major and minor collectors, and local roadways.

Highway 169 serves as a north-south principal arterial and National Highway System (NHS) route. It provides direct and relatively high-speed connections to southern Minnesota and beyond and to the north to the Twin Cities Metropolitan Area and northern Minnesota. The existing ADT (average daily traffic) ranges from 16,600 at the north end to 32,500 in the middle and 23,600 at the southern end of the study area. **Attachment B (Figure 4 in Appendix A)** shows the existing functional classification network in the study area.

Highway 169 functions as a hybrid freeway-expressway in the MAPO planning area, with access restricted to grade-separated interchanges through the urban core of Mankato and North Mankato and at-grade (signalized and unsignalized) access points as the corridor extends radially from the urban core. The middle subarea (Blue Earth River crossing to Veterans' Memorial Bridge) is the only full freeway segment in the study area with a four-lane corridor. The northern subarea (Veterans Memorial Bridge to Lake Street) and southern subarea (Highway 60 to the Blue Earth River crossing) are both a four-lane divided expressway corridor.

One other principal arterial, US Highway 14/Trunk Highway 60, and six minor arterials connect to Highway 169 in the study area. Minor arterials include Belgrade Avenue/Mulberry Street, Lookout Drive, Riverfront Drive, Trunk Highway 68, Gadwall Road/County State Aid Highway (CSAH) 69, CR 33, CR 69/Hawley Street, and Hawthorn Road/CR 90).

Highway 169 is under the jurisdiction of MnDOT. **Attachment B** (**Figure 5 in Appendix A)** shows the roadway jurisdiction in the study area.

Study Area Overview

For ease in describing key corridor characteristics in more depth, the corridor is split into three subareas based on the unique context within each.

Northern Subarea - The northern subarea runs from the Veterans Memorial Bridge to Lake Street. This segment is a four-lane divided expressway with a speed limit of 50 mph.

Middle Subarea – The middle subarea runs from the Blue Earth River crossing to Veterans Memorial Bridge. This is a four-lane divided freeway corridor with a speed limit of 50 mph.

Southern Subarea – The southern subarea runs from Highway 60 to the Blue Earth River crossing. This is a four-lane divided expressway corridor with a speed limit ranging from 50 to 65 mph.

The sections below provide additional detail on these three subareas.

Land Use and Major Traffic Generators

Existing and future land uses in the study area are shown in **Attachment B** (**Figures 6 and 7 in Appendix A)** and described below. This includes maps from the Cities of North Mankato and Mankato's latest Comprehensive Plan updates. There is currently no future land use plan for South Bend Township and the southern subarea of this study. At the time of the study, the Cities of Mankato and North Mankato were in the process of updating their future land use plans for the Riverside North Area in Mankato and the Webster Avenue area in North Mankato as shown in Section V.1 of this report.

Northern Subarea

The northern subarea is within the Cities of Mankato and North Mankato. North of the Highway 169 and Highway 14 interchange is primarily park and open space with some commercial land use. The Kiwanis Recreation Area is a 100-acre, regional destination, many-featured, park including 5-miles of mountain bike trails, cross country ski trails, other trials, dog park, archery range, water access, camping, and a large picnic shelter. South of the Highway 169 and Highway 14 interchange is a large

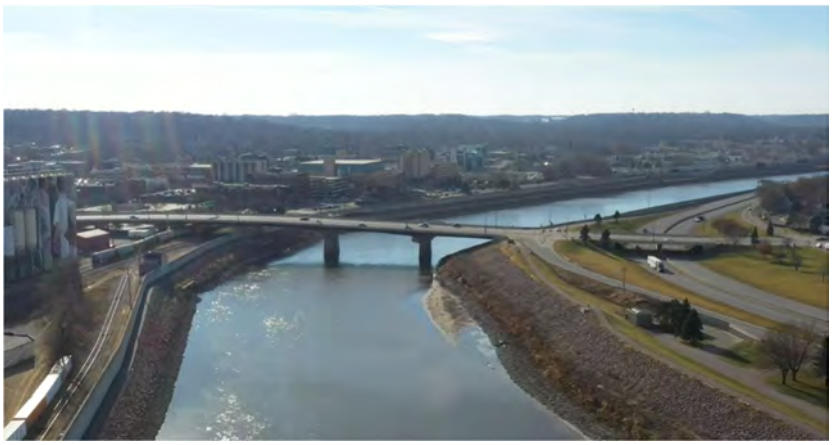
concentration of commercial, heavy industrial, light industrial, residential, and public/institutional land uses served by Lind Street and Webster Avenue connections to Highway 169. This concentration of commercial and industrial land use is a major local and regional traffic generator served by its direct access to Highway 169 and proximity and ease of access to the Highway 169 and Highway 14 interchange. This area also includes high-density residential near Hiniker Pond with access off Lind Street and access to residential neighborhoods, parks and schools in Lower North Mankato via Webster Avenue.

The Lind Street intersection with Highway 169 provides access to a heavy concentration of commercial, heavy and light industrial, residential, and Hiniker Pond.

As Highway 169 moves towards the Veterans Memorial Bridge, direct access spacing becomes more distant, with the surrounding land use being dominated by low density residential. Both the North Mankato and Mankato central business districts can be accessed by the Highway 169/Veterans Memorial Bridge interchange.

Middle Subarea

The middle subarea also includes the Cities of Mankato and North Mankato, with the land uses directly adjacent Highway 169 dominated by low and medium density residential and heavy industrial along the eastern edge of the Minnesota River. Other adjacent land uses include high density residential, mixed use, commercial, and public/institutional. North Mankato Fire Station #1 has access to Highway 169 via Lookout Drive.



Veterans Memorial Bridge is one of three interchanges providing access to Downtown Mankato and North Mankato residential areas in the Middle Subarea.

As the only full freeway segment there is no direct access, traffic movements rely heavily on the Veterans Memorial Bridge, Lookout Drive, and South Riverfront Drive interchanges. These interchanges also provide critical connections to Downtown Mankato for northbound Highway 169 travelers, in addition to the local roadway network in this area for access to West Mankato, southern Mankato and the Minnesota State University, Mankato campus, lower and upper North Mankato, and across the Minnesota and Blue Earth Rivers. This subarea also provides the only two connections across the Minnesota River; at the Veterans Memorial Bridge and the Northstar Bridge, for access between communities.

Southern Subarea

The southern subarea is located in South Bend Township and includes primarily agriculture, low density residential and park and open space land uses directly adjacent Highway 169, with sparse areas of commercial and light industrial.

The Hawley Street intersection with Highway 169 is a key access point to low density residential, industrial, commercial, and park space in South Bend Township.

Connectivity of the local roadway network is inhibited in many areas by topography, including steep slopes and natural areas, the Union Pacific Railroad, the Minnesota and Blue Earth Rivers and adjacent land uses. Limited local network connectivity put pressure on Highway 169 and conversely, any change in access will put pressure on the local system.

VII. Key Transportation Issues

The existing conditions and 2040 no-build analysis identified the following key transportation issues. Full documentation of this analysis is included in **Attachment B**. The issues are summarized by subarea in **Figures 5-7**. These issues are summarized by topic in the narrative that follows the figures.

Figure 5. Summary of Key Issues – Northern Subarea

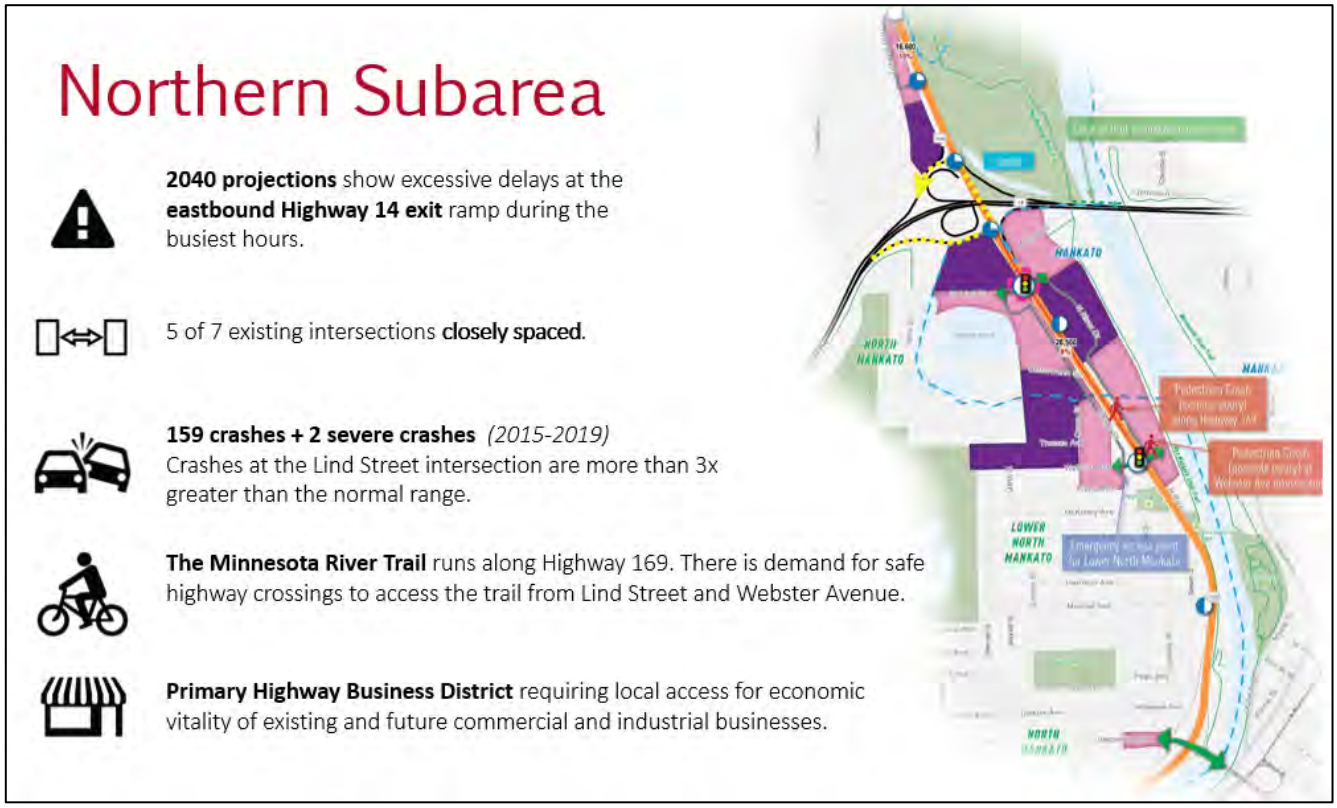
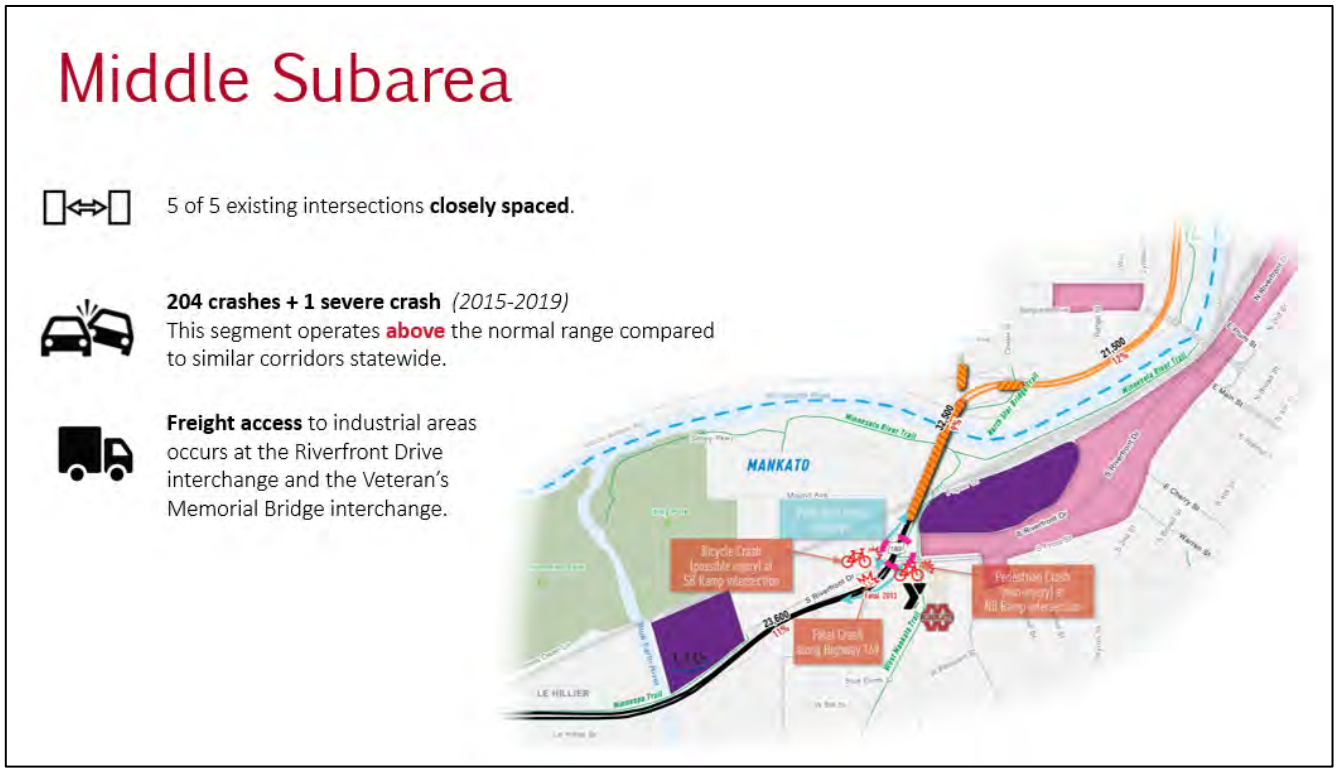
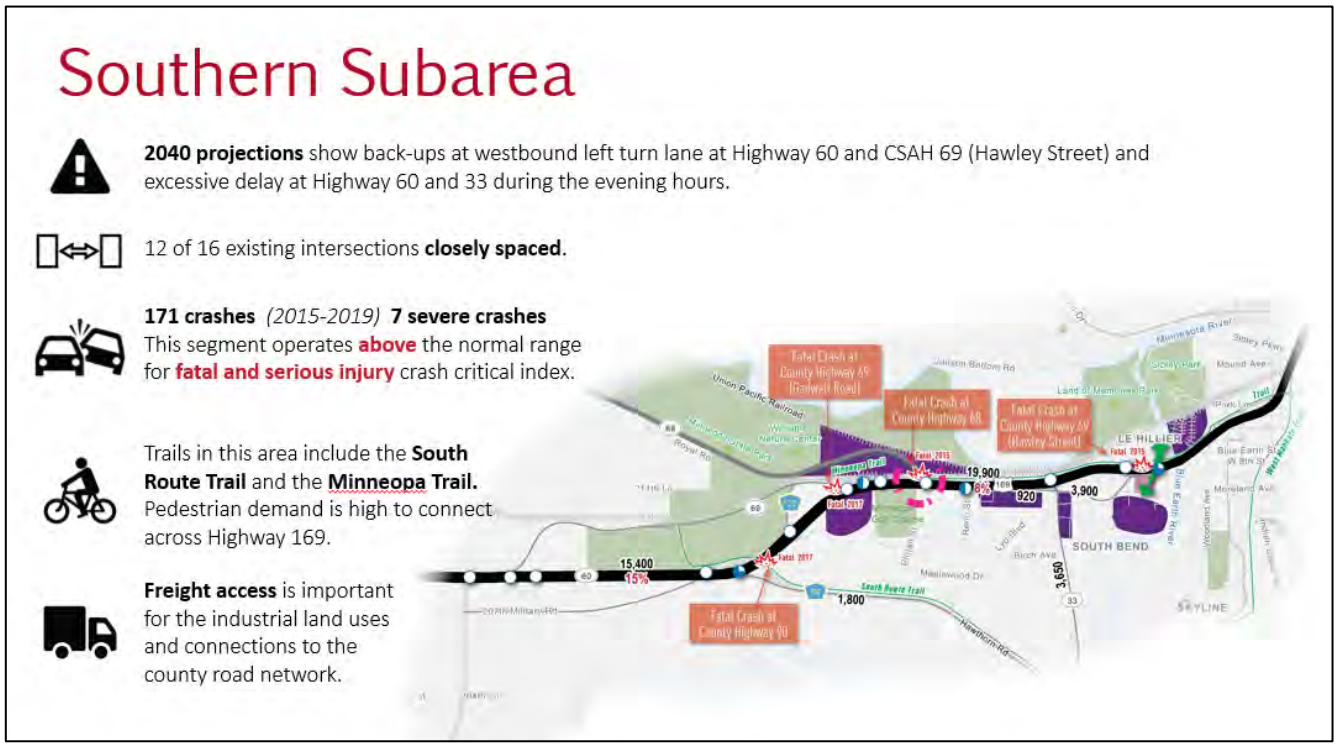


Figure 6. Summary of Key Issues – Middle Subarea



Access spacing applies to the spacing between at grade or grade separated access points. There are no at-grade intersections in the middle subarea so spacing between the grade separated accesses were measured. Recommended spacing from the Minnesota Department of Transportation (MnDOT) Access Management Manual was compared to the actual spacing. This analysis indicated that none of the accesses in the Middle Subarea meet the spacing recommended in the MnDOT Access Management Manual.

Figure 7. Summary of Key Issues – Southern Subarea



- *Existing Capacity Needs:* All intersections overall operate acceptably with Level of Service (LOS) C or better. There are several intersections however with a movement or two that operate with LOS E or F during the peak hours. These include: Lake St NW (North Access) at Highway 169, eastbound TH 14 Exit Ramp at Highway 169, Webster Ave at Highway 169, CR 33 at Highway 169, and TH 60 at Highway 169. Additionally, the following intersections along Highway 169 have problematic queuing issues during the peak hours: Lind St, Webster Ave, Belgrade Ave at the southbound Highway 169 ramps, Riverfront Dr at the southbound Highway 169 ramps, Riverfront Dr at the northbound Highway 169 ramps, and CR 33 at Highway 169**.**
- *Future Capacity Needs:* The 2040 no-build analysis showed that two intersections are anticipated to operate with excessive delay during the peak hours if improvements are not made. These intersections include: eastbound TH 14 Exit Ramp at Highway 169, and CR 33 at Highway 169. Additionally, problematic queuing is anticipated at the following intersections during the 2040 peak hours: eastbound TH 14 Exit Ramp, Lind St, Webster Ave, Belgrade Ave at the southbound Highway 169 ramps, Riverfront Dr at the southbound Highway 169 ramps, Riverfront Dr at the northbound Highway 169 ramps, CR 69 (Hawley St), and CR 33**.**
- *Access Spacing*. Several primary and secondary at grade or grade separated access points along Highway 169 do not meet the spacing recommended in the MnDOT Access Management Manual.
- *Safety***:** The intersections of Lind Street, Riverfront Drive at northbound ramps, and Highway 68 are operating outside the normal range compared to similar intersections. The most common crash type at both Lind Street and Riverfront Drive were rear end crashes. The most common crash type at Highway 68 was right angle crashes. Of the seventeen crashes in the past five years at the Highway 68 intersection there was one fatal crash and one serious injury crash. Highway 169 from Belgrade Avenue to Highway 60 has a segment crash rate outside the statewide average for similar corridors.
- *System Linkages***:** Highway 169 is a principal arterial, National Highway System (NHS) route, and major freight corridor providing a north-south connection between Minneapolis-St. Paul, Mankato/North Mankato, and into southern Minnesota. Highway 169 also provides an important regional connection to US Highway 14. The Mankato/North Mankato area has experienced widespread growth across the metropolitan area and serves southern Minnesota as a hub for health care, education, retail, agriculture, and industry.
- *Local Connectivity & Accessibility***:** Highway 169 provides important local connections passing through the Cities of Mankato and North Mankato. The corridor serves as the point of entry to both Downtowns in Mankato and North Mankato as well as to Minnesota State University Mankato. Highway 169 also provides important local connections to major industrial areas and highway commercial in Mankato, North Mankato, and South Bend Township. Overall, local residential, commercial, industrial, institutional, and recreational uses depend on local connectivity and accessibility to the highway. As previously noted, 41% of corridor traffic is destined for Mankato, 28% is destined for North Mankato, and 7% is destined for South Bend Township.
- *Consistency with State and Local Plans***:** Many previous plans and studies have been completed for the study's system corridors, in which many areas of concern were identified along Highway 169 with crash issues including; at the Highway 14 interchange, Lind Street intersection, and the corridor segment from the Highway 14 south ramp to Webster Street. Previous efforts include five design concepts for the Highway 169 and Highway 14 interchange. Planned projects by MnDOT and the City of Mankato have also resulted. Proposed improvements include roadway expansion, ramp intersection reconfiguration, pavement preservation, pedestrian oriented safety improvements, trail extensions, and transit travel time and reliability solutions. Some of these projects have been programmed for implementation or are soon starting design. All planned and

programmed projects will need to be considered in the development of concept concepts through this effort.

Previous planning efforts have identified major population growth and some development/redevelopment along the Highway 169 corridor (i.e. Riverside North Redevelopment in Mankato and Webster Avenue Area Plan in North Mankato). Population growth coupled with additional commercial, industrial, and residential uses may increase traffic volumes and safety concerns.

Both the City of Mankato and City of North Mankato passed resolutions stipulating their consent to the Corridor Study in July 2019. Both resolutions are included in the previous studies section of this report, and in **Attachment A**.

The City of North Mankato's Comprehensive Plan includes a policy related to Highway 169 listed in the Transportation System Goals, Objectives, and Policies, that states that full access conditions must be maintained at the Webster Avenue/Highway 14 intersection

- *Modal Interrelationships:* The planning area is served by several regional trail connections including the Rex Macbeth River Trail, Minnesota River Trail, West Mankato Trail, Northstar Bridge Trail, and the Minneopa Trail. These trails provide pedestrian and bicycle connections along Highway 169. There are a few gaps that remain including crossing accommodations for pedestrians and bicyclists at Lind Street.

  The area is serviced by the City of Mankato Transit with a few routes intersecting Highway 169 but none currently using the highway corridor.

- *Environmental Considerations:* There are some social, economic, and environmental (SEE) resources in proximity to the planning area that need to be considered that include environmental justice populations, several potentially contaminated sites, scattered stands of trees, grassy areas, lakes, streams, rivers, ponds, and wetlands. Any wildlife displaced by any projects or construction resulting from the completion of this study will likely relocate to suitable nearby areas, including lands immediately adjacent to the project area. A FEMA controlled levee exists along the corridor on the river side of Highway 169 to minimize flooding associated with high water levels in the Minnesota River. The levee is a combination of earthen berm and concrete floodwall that provides flood protection for North Mankato, Mankato, and Le Hillier when the River is at flood stage.

VIII. Purpose and Need

This corridor study purpose and need defines the transportation problems or deficiencies along Highway 169 from Highway 60 to Lake Street. The formation of the purpose and need is based upon existing conditions data and stakeholder input received early in the study process. The identification of needs helps build a common focus among stakeholders on the scope and timing of improvements through defining the "who, what, where, why, and when" of the transportation needs. This also provides project partners and stakeholders with direction on the need for additional analysis required in the next phase of the project development process.

The identified needs and opportunities within the study area will also serve as the cornerstone for developing evaluation criteria, which will be used to create and evaluate a full range of concepts and design options that satisfy the specific project area needs.

Since any major future improvements along the Highway 169 corridor will likely seek federal funding, pertinent Federal Highway Administration (FHWA) transportation purpose and need guidance was used, in part, to help outline transportation needs (and other considerations) in the Highway 169 corridor study area. It is anticipated that standalone purpose and need statements will be required for each future action and that the corridor study needs documented in this corridor study will be utilized

to the extent practicable.

Study Area Background

The study area is located in the cities of Mankato and North Mankato and includes unincorporated areas in Blue Earth and Nicollet Counties (**Figure 1**). The Highway 169 study limits extend from the Highway 60 intersection on the south to the Lake Street intersection on the north. This segment of Highway 169 is designated as a Principal Arterial, as it serves a critical role in the local and regional transportation system. Within the study area, Highway 169 is a four-lane principal arterial roadway with traffic volumes ranging between approximately 15,500 to over 32,000 daily trips.

Highway 169 is an essential route and contributing element to the quality of life and economic vitality of the region by connecting residents and businesses to numerous communities, markets, and other transportation corridors. Beyond serving commuters and commercial freight movements in the study area, Highway 169 provides connections and access to several institutional and recreational facilities. Adjacent land uses vary widely among the three segments of the corridor study area. The northern segment includes a mix of commercial and industrial businesses along with residential developments to the south. The central segment provides freeway level access to the densely developed central business districts of both Mankato and North Mankato. The southern segment transitions from a higher density of mixed uses (commercial, industrial, residential) near the northern portion of this segment to a more scattered mixed-use pattern with areas of open space and agricultural land use.

Purpose

The purpose of the Highway 169 Corridor Study is to identify context-sensitive transportation improvements along Highway 169 and the local supporting roadway system that will improve vehicle safety, maintain high levels of local and regional traffic operations and enhance pedestrian/bicycle movements and safety throughout the study corridor. Future corridor improvements should also address infrastructure conditions, foster economic growth, and be supported by local jurisdictions through the municipal consent process.

Highway 169 Corridor Study Area Needs

This section lists the study area needs based on existing conditions data, future conditions analysis, and public input. The determination of primary needs, secondary needs, and additional considerations was completed after review of the existing and 2040 no-build data/analysis and in consultation with the PMT.

Primary needs include the transportation problem(s) that have been substantiated and recognized by the project partners as priority issues to be solved. Primary needs lead to the initiation of specific improvements/project(s) that resolve current or future concerns. Secondary needs include other transportation problems or opportunities in the study area that may be able to be addressed, if feasible, at the same time that the primary needs are addressed. Additional considerations are other important factors that may have an influential effect on project decisions or project elements. Below is an assessment of US Highway 169 corridor needs and/or additional considerations. The determination of whether a need is considered primary and/or secondary will be determined on a project-by-project basis and at the scoping and preliminary design phase of project development.

Vehicle Mobility

Corridor Operations

Highway 169 is a four-lane divided section throughout the study area. Daily traffic volumes range between 15,500 to 32,000 trips and heavy commercial vehicles account for 8 to 15 percent of all traffic. The number of daily trips along the corridor falls within the capacity of the highway section and is generally comparable to other non-metro (Twin Cities) four-lane facilities found throughout Minnesota. The percent of heavy commercial vehicles is slightly above average for similar highways.

The existing peak hour operations were analyzed using Synchro/SimTraffic software. Based on existing

travel demand, there are no substantial operational issues related to corridor capacity. Analysis of 2040 No-Build corridor operation shows conditions remaining at acceptable levels. The 2040 forecast average travel speeds are expected to remain the same or decrease slightly over the existing conditions along Highway 169. The northern subarea experiences the biggest decrease in average speed with a 3-4 MPH reduction.

Intersection Operations

Existing Intersection Operations

An analysis of existing AM and PM peak hour intersection operations was conducted in Synchro/SimTraffic to understand delay and queuing issues at nineteen intersections located throughout the project area. Existing signal timing was provided by MnDOT and fleet mix percentages (passenger and heavy commercial vehicles) were obtained from previous traffic counts. The following intersections are signalized throughout the project area:

- Lind Street at Highway 169
- Webster Avenue at Highway 169
- Belgrade Avenue at southbound Highway 169 Ramps
- Belgrade Avenue at northbound Highway 169 Ramps
- Riverfront Drive at southbound Highway 169 Ramps

The average intersection delay is a volume-weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from Level of Service (LOS) A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D are generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that travelers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity resulting in substantial delays. **Table 5** shows the intersection delay as well as the maximum delay of all movements at each intersection.

Based on the results of the existing conditions operational analysis, all intersections operate with acceptable LOS C or better, which are commonly perceived as operating at acceptable levels. A LOS D is still considered acceptable but is an indicator that an intersection is approaching capacity and that operational conditions are beginning to adversely impact traffic flows.

While the overall intersection delay is considered acceptable throughout the study area intersections, there are several approach movements operating with unacceptable operations (LOS E or F) during the peak hours. These approaches/movements are detailed below and shown in **Table 5**:

- Lake Street NW (north access) at Highway 169: westbound left turns operate with LOS E in the PM peak hour
- Eastbound Highway 14 Exit Ramp at Highway 169: eastbound left turn operates with LOS F in the PM peak hour
- Webster Avenue/Highway 169 signalized intersection: southbound left turn operates at LOS E for both AM and PM peaks
- CR 33 at Highway 169: northbound left turn operates at LOS F in both the AM and PM peaks
- Highway 60 at Highway 169: northbound left turn operates with LOS F in the PM peak hour.

Table 5. Existing Traffic Operations Analysis Results										
Intersection	A.M. Peak Hour					P.M. Peak Hour				
	Intersection		Maximum Movement			Intersection		Maximum Movement		
	Delay*	LOS	Mvmt	Delay*	LOS	Delay*	LOS	Mvmt	Delay*	LOS
Lake St NW (North Access) at Highway 169	1	A	WBL	27	D	2	A	WBL	41	E
Lake St NW (South Access) at Highway 169	1	A	NBL	6	A	1	A	NBL	9	A
WB TH 14 Entrance Ramp at Highway 169	1	A	NBL	8	A	2	A	NBL	12	B
EB TH 14 Exit Ramp at Highway 169	5	A	EBL	31	D	7	A	EBL	81	F
Lind St at Highway 169	16	B	NBL	49	D	18	B	SBL	48	D
River Ln at Highway 169	4	A	NBR	8	B	5	A	NBR	9	A
Webster Ave at Highway 169	16	B	SBL	69	E	19	B	SBL	64	E
Monroe Ave at Highway 169	5	A	EBR	13	B	4	A	EBR	10	B
Belgrade Ave at SB Highway 169 Ramps	15	B	SBL	30	C	14	B	SBL	35	D
Belgrade Ave at NB Highway 169 Ramps	3	A	NBL	18	B	7	A	NBL	21	B
Owatonna St at SB Highway 169 Ramps	3	A	NBT	29	D	3	A	SBT	3	A
Riverfront Dr at SB Highway 169 Ramps	23	C	SBL	33	C	21	C	SBL	34	C
Riverfront Dr at NB Highway 169 Ramps	6	A	NBL	33	D	5	A	NBL	22	C
CR 69 (Hawley St) at Highway 169	5	A	WBL	32	D	2	A	WBL	12	C
CR 33 at Highway 169	3	A	NBL	50	F	21	C	NBL	423	F
TH 68 at Highway 169	3	A	SBL	18	C	5	A	SBL	34	D
CR 69 (Gadwall Rd) at Highway 169	2	A	SBL	16	C	3	A	SBL	26	D
CR 90 at Highway 169	1	A	WBL	3	A	1	A	WBL	8	A
TH 60 at Highway 169	6	A	NBL	28	D	7	A	NBL	145	F

*Delay in seconds per vehicle.

Several traffic queuing issues were also identified in the existing operational analysis. Specific details of each movement/intersection approach are contained in the *Highway 169 Corridor Study – Traffic Operations Evaluation Report.* Below is a summary of problematic queues:

- Lind Street: the maximum northbound queue blocks access to left and right turn lanes during both peak hours and the maximum westbound queues in the AM and PM peak hours extend beyond Lind Court
- Webster Avenue: the maximum eastbound queues in both the AM and PM peaks extends to and beyond the Range Street intersection resulting in operational impacts along Range Street and in some cases blocking driveway access to surrounding businesses. The maximum AM and PM westbound queues extend to River Drive resulting in delays for trips along River Drive

- Belgrade Avenue at Southbound Highway 169 Ramps: the maximum eastbound thru movement queue extends past Nicollet Avenue during both peak hours and the maximum westbound left queue extends beyond the turn lane during the PM peak
- Riverfront Drive at Southbound Highway 169 Ramps: during both the AM and PM peak hours the maximum southbound queues extend past Owatonna Street, however the queues do not extend onto Highway 169
- Riverfront Drive at Northbound 169 Ramps: the maximum westbound queues in AM peak extend through the intersection of Poplar Street and Riverfront Drive whereby impacting traffic operations at this intersection
- CR 33 at Highway 169: the maximum northbound queue in the PM peak hour extends approximately 850 feet causing traffic to back up through the Southbend Avenue intersection which is located only 200 feet from the CR 33 and Highway 169 intersection.

2040 No-Build Intersection Operations

An analysis of forecast AM and PM peak hour intersection operations was conducted in Synchro/SimTraffic for the same nineteen intersections located throughout the project area. As shown in **Table 6**, the 2040 No-Build operational analysis shows several deficiencies and unacceptable levels of service.

The results of the 2040 No-Build operational analysis indicates that most intersections are anticipated to continue to operate acceptably with LOS C or better except the following intersections which operate with LOS E or F:

- Eastbound Highway 14 Exit Ramp at Highway 169: Intersection operates with LOS D in the AM peak hour and LOS F during the PM peak hour
- Eastbound Highway 14 Exit Ramp at Highway 14: Queues from the eastbound Highway 14 Exit Ramp/Highway 169 intersection back up onto Highway 14 causing the exit ramp (which should be free flowing) to operate with LOS E in the PM peak
- CR 33 at Highway 169: The intersection operates at LOS F in the PM peak hour
- Highway 60 at Highway 169: The intersection operates at LOS D in the PM peak hour

Table 6. 2040 No Build Traffic Operations Analysis Results										
Intersection	A.M. Peak Hour					P.M. Peak Hour				
	Intersection		Maximum Movement			Intersection		Maximum Movement		
	Delay*	LOS	Mvmt	Delay*	LOS	Delay*	LOS	Mvmt	Delay*	LOS
Lake St NW (North Access) at Highway 169	2	A	EBL	37	E	4	A	EBL	81	F
Lake St NW (South Access) at Highway 169	1	A	NBL	10	A	1	A	NBL	13	B
WB TH 14 Entrance Ramp at Highway 169	2	A	NBL	15	B	2	A	NBL	18	C
EB TH 14 Exit Ramp at Highway 169	25	D	EBL	204	F	87	F	EBL	926	F
EB TH 14 Exit Ramp at TH 14	1	A	NBR	2	C	43	E	NBR	297	F
Lind St at Highway 169	20	C	NBL	52	D	24	C	NBL	51	D
River Ln at Highway 169	6	A	NBR	10	B	7	A	WBR	12	B
Webster Ave at Highway 169	19	B	SBL	62	E	21	C	SBL	61	E
Monroe Ave at Highway 169	6	A	EBR	18	C	5	A	EBR	15	C
Belgrade Ave at SB Highway 169 Ramps	17	B	SBL	29	C	16	B	SBL	39	D
Belgrade Ave at NB Highway 169 Ramps	4	A	NBL	23	C	9	A	NBL	28	C
Owatonna St at SB Highway 169 Ramps	4	A	NBT	23	C	3	A	SBT	3	A
Riverfront Dr at SB Highway 169 Ramps	26	C	EBT	32	C	22	C	EBT	31	C
Riverfront Dr at NB Highway 169 Ramps	9	A	NBL	46	E	8	A	NBL	33	D
CR 69 (Hawley St) at Highway 169	16	C	WBL	129	F	2	A	WBL	18	C
CR 33 at Highway 169	5	A	NBL	148	F	130	F	NBL	1385	F
TH 68 at Highway 169	6	A	SBL	46	E	8	A	SBL	70	F
CR 69 (Gadwall Rd) at Highway 169	3	A	SBL	23	C	3	A	SBL	36	E
CR 90 at Highway 169	1	A	WBL	6	A	1	A	WBL	12	B
TH 60 at Highway 169	7	A	NBL	57	F	25	D	NBL	1200	F

*Delay in seconds per vehicle.

Additionally, several intersection approaches/movements are expected to operate at LOS E or F and numerous problematic traffic queues have been identified under the 2040 No-Build condition. As shown in **Table 6**, eight intersection approaches in the AM peak hour and eight in the PM peak hour will potentially experience unacceptable (LOS E/F) operating conditions. Specific details of the forecast operations and problematic queuing conditions at the study area intersections is contained in the *Highway 169 Corridor Study – Traffic Operations Evaluation Report*.

System Connectivity

StreetLight® Insight data was used to analyze the origin-destination of trips using the Highway 169 corridor in order to determine the type of trip (local vs. regional) and if there are similarities or differences in travel patterns among the three subareas. The analysis reviewed all vehicles using the highway as well as a separate review of just heavy commercial vehicles/haulers. The full results of the

analysis can be found in Attachment B – Existing Conditions Report, Corridor O/D Assessment on page 27.

The StreetLight data indicates that the majority of vehicles passing through the Northern Subarea (62% all vehicles and 39% trucks) and Middle Subarea (69% all vehicles and 37% trucks) are local trips destined for locations within the Mankato and North Mankato. Approximately 43% of all vehicles and 30% of heavy commercial trucks passing through the Southern Subarea were shown to have local destinations in the Mankato and North Mankato area. These findings emphasize the need for safe and efficient connections between Highway 169 and the local arterial system in order to effectively serve the existing and future travel demands and patterns.

A more detailed review of trips with destinations in the Northern and Southern Subareas was also conducted. The main trends of the daily travel patterns are summarized below:

Northern Subarea:

- *All Vehicle Traffic* – 62% of all traffic passing through the northern subarea are destined for North Mankato and Mankato. The primary destinations of northbound Highway 169 traffic include Belgrade Avenue east of Highway 169 (29%), Highway 14 east of Highway 169 (21%) and through trips continuing north of Lake Street (22%). Similarly, the primary destinations of southbound Highway 169 traffic include Belgrade Avenue east of Highway 169 (16%), Highway 14 east of Highway 169 (14%), Highway 14 west of Highway 169 (14%), and through trips continuing south of Belgrade Avenue (35%).
- *Heavy Commercial Traffic* – 39% of all freight traffic passing through the northern subarea are destined for Blue Earth County and Nicollet County. The main destinations of northbound trucks on Highway 169 include Highway 14 east of Highway 169 (27%) and through trips continuing north of Lake Street (45%). Southbound truck destinations include Highway 14 east of Highway 169 (13%) and through trips continuing south of Belgrade Ave (57%).

This analysis indicates that most of the heavy commercial vehicle traffic in the northern subarea remains on Highways 169 and 14, with Belgrade Ave east of Highway 169 being another important destination for both northbound and southbound Highway 169 traffic.

Southern Subarea:

- *All Vehicle Traffic* – 43% of all traffic passing through the southern subarea are destined for North Mankato and Mankato. The majority of traffic remains on Highway 169 throughout the entire subarea (74%). The only other roadways with more than 2% of the traffic include Highway 60 west of Highway 169 (5%), CR 90 (5%), and CR 33 (6%). The southbound destinations differ slightly with the primary destinations being CR 69/Hawley Street (19%), CR 33 (10%), Highway 68 (10%), Highway 169 south of Highway 60 (9%), and Highway 60 west of Highway 169 (41%).
- *Heavy Commercial Traffic* – 30% of the freight traffic passing through the southern subarea are destine for North Mankato and Mankato. Most northbound traffic remains on Highway 169 throughout the entire subarea (76%), while 11% are destine west of Highway 60, 3% connect to CR 90, and 5% are destined to Highway 68. Most of the southbound trips end up along Highway 60 west of Highway 169 (83%) with other roadways having lesser of a draw with Highway 169 south of Highway 60 receiving 6%, Highway 68 attracting 3%, and approximately 4% destine to CR 69/Hawley Street.

This analysis indicates that most of the traffic remains on Highway 169 or Highway 60 throughout the southern subarea, but the all vehicle analysis showed that CR 69/Hawley St and CR 33 are also popular destinations for southbound Highway 169 traffic in addition to Highways 60 and 169.

Vehicle Safety

Vehicle safety is a primary need throughout the corridor study area. A safety assessment was completed to determine "hot spots" along Highway 169 where crash history data identifies safety concerns. The safety analysis included a review of five-year (2015-2019) crash data at intersections, interchanges, and along the highway segments. In addition to vehicle crashes, the analysis also considered pedestrian and bicycle crashes. A complete summary of the safety assessment can be found in **Attachment B** – Appendix D, Existing Safety Analysis on page 2.

Intersection Crash Analysis

A crash analysis, utilizing five-year crash data (2015-2019), was completed for fifteen intersections located throughout the study area. The following Highway 169 intersections or interchange ramp terminal intersections were included in the crash analysis:

- Lake Street NW Northern Access: at-grade intersection with side street stop control
- Lake Street NW Southern Access: at-grade intersection with side street stop control
- Lind Street: at-grade signalized intersection
- Webster Avenue: at-grade signalized intersection
- Belgrade Avenue at Southbound Ramps: signalized intersection
- Belgrade Avenue at Northbound Ramps: signalized intersection
- Riverfront Drive at Northbound Ramps: stop control for exit ramp
- Riverfront Drive at Southbound Ramps: signalized intersection
- Hawley Street/CR 69: at-grade intersection with side street stop/yield control
- Hemlock Road/CR 33: at-grade intersection with side street stop/yield control
- Highway 68: at-grade intersection with side street stop control
- Gadwall Road/CR 69: at-grade intersection with side street stop control
- Loren Drive: at-grade intersection with side street stop control
- Gadwall Road West /CR 69: at-grade intersection with side street stop control
- Highway 60: at-grade intersection with side street stop/yield control

The intersection crash analysis shows that three intersections have statistically significant safety concerns with critical index values greater than one (see **Table 7**). Another location of interest is the Hawley Street/CR 69 intersection, which has a critical index less than one but has a fatal and serious injury index of 1.07 for the five-year reporting period.

Table 7. Intersections with Safety Concerns						
Intersection	**Total Crashes**	**Severe Crashes (K + A)**	**Actual Crash Rate**	**Statewide Average**	**Critical Rate**	**Critical Index**
Lind Street at Highway 169[a]	70	1*	1.45	0.45	0.71	**2.04**
Riverfront Dr. at NB Highway 169 Ramps[b]	19	0	0.49	0.18	0.37	**1.32**
Highway 68 at Highway 169[c]	17	2	0.38	0.18	0.36	**1.06**
[a] *located in Northern Subarea* [b] *located in Middle Subarea* [c] *located in Southern Subarea*						

*The serious injury crash at Lind Street was the result of a motorist under the influence and no relation to existing geometry or infrastructure issues.

While all three intersections demonstrate localized safety concerns, the Lind Street intersection is especially concerning with a crash rate over three times the statewide average for similar intersections and a critical index value of 2.04.

Interchange Crash Analysis

Safety conditions over the five-year analysis period (2015-2019) at the Highway 14, Belgrade Avenue, Lookout Drive, Riverfront Drive, and Hawthorn Road/CR 90 interchanges were also evaluated. Since ramp merge areas are not considered a typical intersection type or highway segment, crashes within these interchange ramp areas were reviewed for crash trends.

Highway 169/Highway 14 Interchange

During the five-year reporting period there were a total of 22 reported crashes at the interchange. The data indicates that most crashes resulted in property damage, however three minor injury and five possible injury crashes were reported. Additional crash information and trends can be found in in **Attachment B** – Appendix D, Existing Safety Analysis starting on page 2.

Photo taken along Highway 14 WB exit ramp to NB Highway 169. *Source: Google Maps*

Belgrade Avenue Interchange

Three crashes were reported during the five-year study period. All of which were run off the road type crashes, one of which resulted in a "possible injury" crash.

Highway 169/Lookout Drive Interchange

From 2015 to 2019 there were 19 reported crashes at the Highway 169/Lookout Drive interchange. The location of the crashes and trends in crash types are summarized below.

- 11 crashes were along the northbound Highway 169 exit ramp to Lookout Drive
- 4 crashes were along the southbound Highway 169 exit ramp to Lookout Drive
- 2 crashes were along the entrance ramp to northbound Highway 169
- 2 crashes were long the entrance ramp to southbound Highway 169

Of the 19 reported crashes, 15 involved vehicles that ran off the road while traversing the ramps at this interchange. The majority of crashes (13 of 19) involved property damage only, 2 had possible injuries, and 4 involved minor injuries.

Riverfront Drive Interchange

During the five-year reporting period there were a total of 11 reported crashes at the merge/diverge areas of the interchange. The data indicates that most crashes resulted in property damage, however one possible injury crash was reported.

Highway 169/Hawthorn Road (CR 90) Interchange

From 2015 to 2019 there were four reported crashes at the Hawthorn Road/CR 90 interchange. One of the crashes resulted in a fatality of a motorcycle that was merging onto northbound Highway 169 from westbound Hawthorn Road/CR 90 and collided with another vehicle. The other three crashes resulted in property damage only. Two of the property damage crashes involved vehicles attempting to turn left onto Hawthorn Road/CR 90 from southbound Highway 169 and the third involved a vehicle merging onto southbound Highway 169.

Segment Crash Analysis

A segment crash analysis for the three Highway 169 subareas/segments was completed using the five-year crash data from 2015-2019. The limit of each subarea is described below:

- *Northern Subarea* – covers the portion of the study area from Lake Street on the north to the Veterans' Memorial Bridge/Belgrade Avenue on the south. This approximately 2-mile segment is a four-lane divided expressway with a speed limit of 50 mph
- *Middle Subarea* – runs from the Veterans' Memorial Bridge/Belgrade Avenue to the Blue Earth River crossing. This 2.3-mile segment is a four-lane freeway corridor with a speed limit of 50 mph
- *Southern Subarea* – covers the portion of the study area from the Blue Earth River crossing to southern study limit at Highway 60. This 4.4-mile segment is a four-lane expressway with speed limits ranging from 50 mph to 65 mph.

All three subareas were analyzed with and without intersection related crashes. The analysis shows that without the intersection related crashes included, none of the segments appear to have a crash issue, but there is a high frequency of crashes spread out along each subarea. The most common crash type in all three subareas is run off the road crashes (54% in the northern subarea, 67% in the middle subarea, and 57% in the southern subarea).

An assessment was also completed that added in the intersection related crashes. This shows that the middle subarea operates with a critical index of 1.09, which indicates a safety concern. Also, the southern subarea has seven severe crashes and a fatal and serious injury critical index of 1.03. This indicates that the southern segment is operating above the normal range for fatal and serious injury crashes compared to similar roadway segments statewide.

Contributing Conditions

The physical characteristics of highways, interchanges, and intersections can contribute to safety issues. Below is a list of geometric conditions that may have contributed to past safety concerns.

- Westbound Highway 14 to northbound Highway 169 Exit Ramp – two reported crashes along the westbound Highway 14 exit ramp to northbound Highway 169 both involved a vehicle that crossed over the solid white lines along the ramp and northbound 169 travel lanes while attempting to get back onto westbound Highway 14 via the left turn from northbound Highway 169 to the westbound Highway 14 entrance ramp. The photo displayed on page 44 depicts this area. There is a sign along the exit ramp that shows this left turn movement prohibited and pavement striping is present restricting this movement, however these crashes indicate that the sign and paint prohibiting this movement might not be sufficient.
- Riverfront Drive at northbound Highway 169 Entrance Ramp – five rear end crashes have occurred as vehicles were turning right onto the northbound Highway 169 entrance ramp. Westbound right turns are required to yield to eastbound vehicles, but these crashes indicate that vehicles are not always anticipating the need to stop and yield to other traffic. With the right turn channelized and the non-signalized intersection, vehicles may be incorrectly assuming they have the right of way and therefore are not expecting the vehicle in front of them to stop for oncoming traffic.
- Highway 68 at Highway 169 – six right angle crashes have occurred involving vehicles attempting to turn left from Highway 68 onto northbound Highway 169 that were struck by a vehicle in the southbound direction along Highway 169. Several injuries and a fatality have resulted due in part to speeds of 65 mph along this portion of Highway 169 and the intersection sight distance for the left turn movement from TH 68 onto Highway 169 being approximately 25 percent less than the recommended distance of 720 feet. This distance is not met for southbound Highway 169 traffic due to the vertical curvature of the roadway.

Another key component can be the inadequate spacing of access points, especially where heavy entering/exiting volumes exist, which can lead to considerable weaving problems and conflicts between faster moving thru trips and slower moving vehicle entering/exiting the highway. As shown in **Table 8,** the distance between access points in the study area rarely complies with the recommended spacing distances listed in MnDOT's Access Management Manual. Additional access information for the study area can be found in Attachment B – Existing Conditions Report, Access on page 31.

Table 8. Spacing Between Highway 169 Corridor Study Access Points

Spacing Between Primary Intersections			
Primary Intersections[1]	**Miles**	**Recommended Spacing (Miles)**	**Meets Spacing Recommendation**
Highway 14 to Webster Avenue	0.64	0.5	Yes
Webster Avenue to Belgrade Avenue	0.60	0.5	Yes
Belgrade Avenue to Lookout Drive	0.09	1	No
Lookout Drive to Riverfront Drive	0.13	1	No
Riverfront Drive to CR 69 (Hawley Street)	0.74	1	No
CR 69 (Hawley Street) to CR 33	0.57	1	No
CR 33 to Highway 68	0.68	1	No
Highway 68 to CR 90	1.2	1	Yes
CR 90 to Highway 60	1.4	1	Yes
Spacing Between Secondary Intersections[1]			

Table 8. Spacing Between Highway 169 Corridor Study Access Points			
Secondary Intersection	**Miles**	**Recommended Spacing (Miles)**	**Meets Spacing Recommendation**
Lake Street (North) to Lake Street (South)	0.02	0.5	No
Lake Street (South) to Highway 14	0.16	0.5	No
Highway 14 to Lind Street	0.08	0.5	No
Lind Street to River Lane	0.14	0.25	No
River Lane to Webster Avenue	0.44	0.25	Yes
Webster Avenue to Monroe Avenue	0.45	0.25	Yes
Monroe Avenue to Belgrade Avenue	0.15	0.25	No
Riverfront Drive to Woodland Avenue	0.42	0.5	No
Woodland Avenue to CR 69 (Hawley Street)	0.32	0.5	No
CR 69 (Hawley Street) to Amos Owen Lane	0.19	0.5	No
Amos Owen Lane to CR 33	0.38	0.5	No
CR 33 to Bison Street	0.50	0.5	Yes
Bison Street to Highway 68	0.18	0.5	No
Highway 68 to 211th Lane	0.32	0.5	No
211th Lane to CR 69 (Gadwall Road)	0.14	0.5	No
CR 69 (Gadwall Road) to CR 120	0.47	0.5	No
CR 120 to CR 90	0.26	0.5	No
CR 90 to CR 117	0.10	0.5	No
CR 117 to Loren Drive	1.02	0.5	Yes
Loren Drive to CR 69 (Gadwall Road)	0.14	0.5	No
CR 69 (Gadwall Road) to Highway 60	0.14	0.5	No
A primary intersection refers to a junction between two major roads and a secondary access refers to a junction between a major road and a minor road or local street. Based on the definitions I categorized the intersections based on the functional classification. Since Lind St is classified as a local roadway I believe it should be considered a secondary intersection.			

As shown above, only 4 of the 9 primary intersections and 4 of the 21 secondary intersections along Highway 169 meet the recommended spacing distance. It should be noted that the 211th Lane and Loren Drive intersection are technically local roadways, but they only serve a few businesses and therefore could be classified as driveways; however, they were analyzed as secondary access points as they both provide full access to Highway 169.

Modal Interrelationships

Regional Freight Movements

A number of freight generating businesses/developments have been identified throughout the study corridor. According to 2019 traffic data, heavy commercial vehicles account for approximately 8 to 15 percent of all trips on Highway 169. The percentage of trucks has increased in the latest traffic

According to 2019 traffic data, heavy commercial vehicles account for approximately 8 to 15 percent of all trips on Highway 169.

counts by as much as five percent. This increase may in part be connected to recent capacity improvements along Highway 60 southwest of the study area.

Safe and reliable access to freight generating developments as well as efficient connections to the extensive county road network is important to the long term viability of these industries to deliver and receive goods to/from regional markets outside the study area. While existing access conditions appear to adequately serve freight operations, there are local circulation issues, intersection geometry constraints, and connectivity opportunities within all three corridor subareas that need to be considered in evaluating future improvements in order to ensure safe and efficient freight movements to current and future commercial, industrial, and manufacturing land uses. Below is a brief description of the important freight access points and routes within each subarea of the corridor study area:

- *North Subarea* – the Lake Street, Lind Street, Webster Street intersections and Belgrade Avenue interchange provide sufficient access for freight movements. Range Street (west) and North River Drive (east) serve as frontage/backage roads along Highway 169, allowing heavy commercial vehicles to efficiently access existing and future freight dependent developments. In several locations the existing geometrics (lane/shoulder widths, sight distance, lack of turn lanes, and turning radii) creates challenges for freight movements.
- *Middle Subarea* – the Riverfront Drive interchange provides access to several commercial and industrial/manufacturing nodes in this portion of the study area. Riverfront Drive, Poplar Street, Front Street, and Sibley Parkway are a few of the primary local roadways connecting freight movements to Highway 169 and other county roads. The presence of the railroad corridor, the Minnesota River and Blue Earth River have contributed to the challenge of creating efficient and direct connections between land uses. Intersection geometry, congestion, and traffic control also present a variety of constraints for freight movements in this subarea. Future improvements shall evaluate the effectiveness of removing these barriers/constraints that currently affect freight operations.
- *South Subarea* – the Hawley Street, County Road 33, Highway 68, and County Road 69 are the primary intersections that provide access for heavy commercial vehicles to larger freight generating businesses in the south subarea. Several other full and partial access points existing in this subarea that are used by freight traffic. All at-grade access points along a higher speed arterial roadway can present safety and mobility issues for slower moving freight vehicles to enter and exit Highway 169. While right and left turn lanes exist at the major intersections, only the Highway 68 and County Road 33 intersections have acceleration lanes for heavy trucks to utilize while getting up to speed on Highway 169.

Walkability/Bikeability

Within the study area communities, there are many destinations for pedestrians and bicyclists to travel to/from. Facilities within the pedestrian network include sidewalks, multi-use (shared-use) trails, and pedestrian crossing infrastructure. Facilities within the bicycle network include on-street bikeways and off-street bikeways or multi-use trails. The communities of Mankato and North Mankato have robust park and public space networks, residential neighborhoods, and commercial/industrial nodes.

The area surrounding the Highway 169 corridor study area includes several existing local and regional pedestrian/bicycle facilities that provide non-motorized vehicles access to many local destinations. Complete descriptions of existing facilities and maps illustrating the existing and planned network of sidewalks and trails can be found in Attachment B – Existing Conditions Report, Pedestrian and Bicycles Connections on page 33. Listed below is a summary of pedestrian and bicycle facility needs within the study area.

- *ADA Compliant Features* – several trails that cross Highway 169 are currently not ADA compliant. This is the case at Lind Street, Webster Avenue, Riverfront Drive, CR 69, and Highway 14

- *System Gaps/Barriers* – connectivity for pedestrian and bicycle movements is a need within the study area as higher speed highway corridors such as Highway 169 and waterways such as the Minnesota River and Blue Earth River can create barriers for non-motorized travelers to cross unless existing bridges are designed to accommodate these movements. Currently only the Belgrade Avenue Bridge over Highway 169, the Highway 169 (North Star Bridge) over the Minnesota River, and Highway 169 Blue Earth River Bridge have dedicated pedestrian/bicycle facilities.

  Several gaps and missing connections have been identified through planning studies completed by the municipalities within the Highway 169 corridor study area:

  - A key missing connection exists in the north subarea where trails exist along both the east and west sides of the Minnesota River, but no connection exists across the river. This limits access to surrounding recreational features, area destinations, and an efficient connection between the West River Trail and the Minnesota River Trail.

Rex Macbeth River Trail on the west side of the Minnesota River in the Northern Subarea.

  - Highway 169 creates a barrier for pedestrian/bicycle crossing at the Hawley Street (CR 69) and Highway 169 intersection due to the need to connect the residential areas both north and south of the highway to local destinations and to the Minneopa Trail for access across the Blue Earth River Bridge. A striped crosswalk was removed from this location due to safety concerns; yet demand continues to exist for crossing the highway in this location.
  - The trail on the Blue Earth River Bridge is the only east/west pedestrian and bicycle facility into West Mankato and to destinations such as Roosevelt Elementary School, West High School, and commercial/business developments. The next closest crossing is located approximately two miles downstream at the Hawthorn Road (CR 90) bridge across the Blue Earth River.

Pedestrian and Bicycle Crashes

A crash analysis showed there were four crashes involving a pedestrian or bicyclists over the last ten years (2010-2019) in the study area. The frequency and severity of crashes involving these vulnerable modes of travel does not demonstrate a substantial safety concern.

- Pedestrian Crashes – a serious injury crash was reported along Highway 169 between River Lane and Webster Avenue where a pedestrian was struck walking along the shoulder of Highway 169. A second pedestrian crash involved possible injuries and was reported at the Highway 169 and Webster Avenue intersection.

- Bicycle Crashes – two crashes involving bicyclists were reported in the study area. A non-injury crash was reported at the intersection of Riverfront Drive and the northbound Highway 169 ramp terminal intersection, and a possible injury crash occurred at the intersection of Riverfront Drive and the southbound Highway 169 ramp terminal intersection.

Infrastructure Conditions

Bridge Conditions

Bridge conditions is a transportation need as three bridges in the Highway 169 corridor study area that have been planned for improvements/preservation work to be completed in 2027. The following bridges in the study area are included in the District 7 10-Year Capital Highway Investment Plan (Draft 2021-2030):

- Bridge No. 52012 – Northbound and southbound Highway 169 bridge over northbound Highway 169 exit ramp to Lookout Drive/Center Street
- Bridge No. 07029 – Northbound and southbound Highway 169 bridge over Riverfront Drive
- Bridge No. 9098 – Northbound and southbound Highway 169 bridge over Minnesota River, Union Pacific Railroad, and Sibley Parkway

Two additional bridges along Highway 169 have been recognized for future rehabilitation improvements, but not set timeframe for completion has been identified at this time:

- Bridge No. 52008 – Southbound Highway 169 exit ramp bridge to Lookout Drive (over Sherman Street/Highway 169 southbound entrance ramp)
- Bridge No. 52011 – Southbound Highway 169 exit ramp bridge to Lookout Drive (over northbound Highway 169 exit ramp to Lookout Drive/Center Street)

Table 9 shows the existing conditions of the five bridges identified for preservation/rehabilitation improvements.

Table 9. Highway 169 Corridor Study Bridges with Planned Improvements

Bridge Characteristics	**Bridge 52008** SB Hwy 169 exit ramp to Lookout Drive (over Sherman St.)	**Bridge 52011** SB Hwy 169 exit to Lookout Dr. (over Hwy 169 exit to Lookout Dr/Center St)	**Bridge 52012** Hwy 169 exit ramp to Lookout Dr.	**Bridge 9098** NB/SB Hwy 169 over MN River, UP RR, Sibley Pkwy	**Bridge 07029** NB/SB Hwy 169 over Riverfront Dr
Year Built	1992	1992	1992	1960	1992
Inspection Date	July 2018	July 2018	August 2018	May 2018	August 2018
Vertical Clearance	No restrictions	No Restrictions	No restrictions	No restrictions	No restrictions
Deficient Status[1]	Adequate	Adequate	Adequate	Adequate	Adequate
Sufficiency Rating[2]	95.7	99.8	93.0	95.9	93.4
[1]Vertical clearances with no restrictions indicate bridges that meet new bridge construction standards: minimum 16'-4" vertical clearance for bridges carrying roadways over highways and 17'-4" for bridges carrying trails only over highways. [2]Sufficiency rating is a percentage scale of 0-100 (100% being entirely sufficient). Generally, to be eligible for bridge rehabilitation, a sufficiency rating of 80% or less is required, and to be eligible for bridge replacement, a sufficiency rating of 50% or less.					
NBI Condition Rating[4]					
Deck	7	8	7	6	6
Superstructure	7	7	8	6	7

Table 9. Highway 169 Corridor Study Bridges with Planned Improvements					
Bridge Characteristics	**Bridge 52008** SB Hwy 169 exit ramp to Lookout Drive (over Sherman St.)	**Bridge 52011** SB Hwy 169 exit to Lookout Dr. (over Hwy 169 exit to Lookout Dr/Center St)	**Bridge 52012** Hwy 169 exit ramp to Lookout Dr.	**Bridge 9098** NB/SB Hwy 169 over MN River, UP RR, Sibley Pkwy	**Bridge 07029** NB/SB Hwy 169 over Riverfront Dr
Substructure	7	7	7	6	7
NBI Appraisal Rating[4]					
Structure Evaluation	7	7	7	6	7
Deck Geometry	6	6	9	9	9
Under-Clearances	4	6	4	5	6
Waterway Adequacy	NA	NA	NA	9	NA
Approach Alignment	8	8	8	8	8

[4]National Bridge Inventory (NBI) ratings range from 0 to 9, with 0 being a failed condition, and 9 being an excellent condition (such as newly constructed). NBI Condition and Appraisal Ratings with values of 4 or less are highlighted in yellow in the table. A value of "4" indicates a rating of "poor," and a value of "3" indicates a serious condition.

Table Note: Data obtained from each bridge's 2018 Structural Inventory Report, the most recent available data, generated after the latest inspections in 2018. Additional information on ratings can be found in MnDOT's Bridge Inspection Manual.

Bridge Improvement Needs

The bridge improvements listed in the District 7 10-year Capital Highway Improvement Plan (CHIP) will be further scoped by MnDOT as projects are moved from the CHIP to the current 4-year State Transportation Improvement Program (STIP).

Highway 169 bridge improvements from approximately Riverfront Drive to Lake Street (2027 planned) include roadway and bridge rehabilitation, including major work on the Northstar Bridge. MnDOT has also indicated that within the next 10-15 years it is anticipated that Bridge 07023 (Highway 14 over Highway 169) and Bridge 07011 (Highway 14 over Minnesota River and UP Railroad) will likely require rehabilitation work. The corridor vision established as part of the Highway 169 Corridor Study and additional transportation needs of the region will be used to inform future investments.

Pavement Conditions

Pavement conditions are an important component for maintaining safe driving conditions. Segments where the pavement experiences fatigue/alligator cracking, potholes with patching, and transverse or longitudinal cracking can compromise the smoothness of the driving surface . This in turn can result in loss of vehicle control, a reduction in a driver's or bicyclist's ability to perform maneuvering tasks, and can increase the frequency of lost loads and debris on the roadway.

Pavement Indices

MnDOT uses four indices for reported pavement conditions. Each index describes a different aspect of pavement conditions and can be used to rank pavement sections and predict the need for future maintenance and rehabilitation. The MnDOT pavement condition indices are described in **Table 10**.

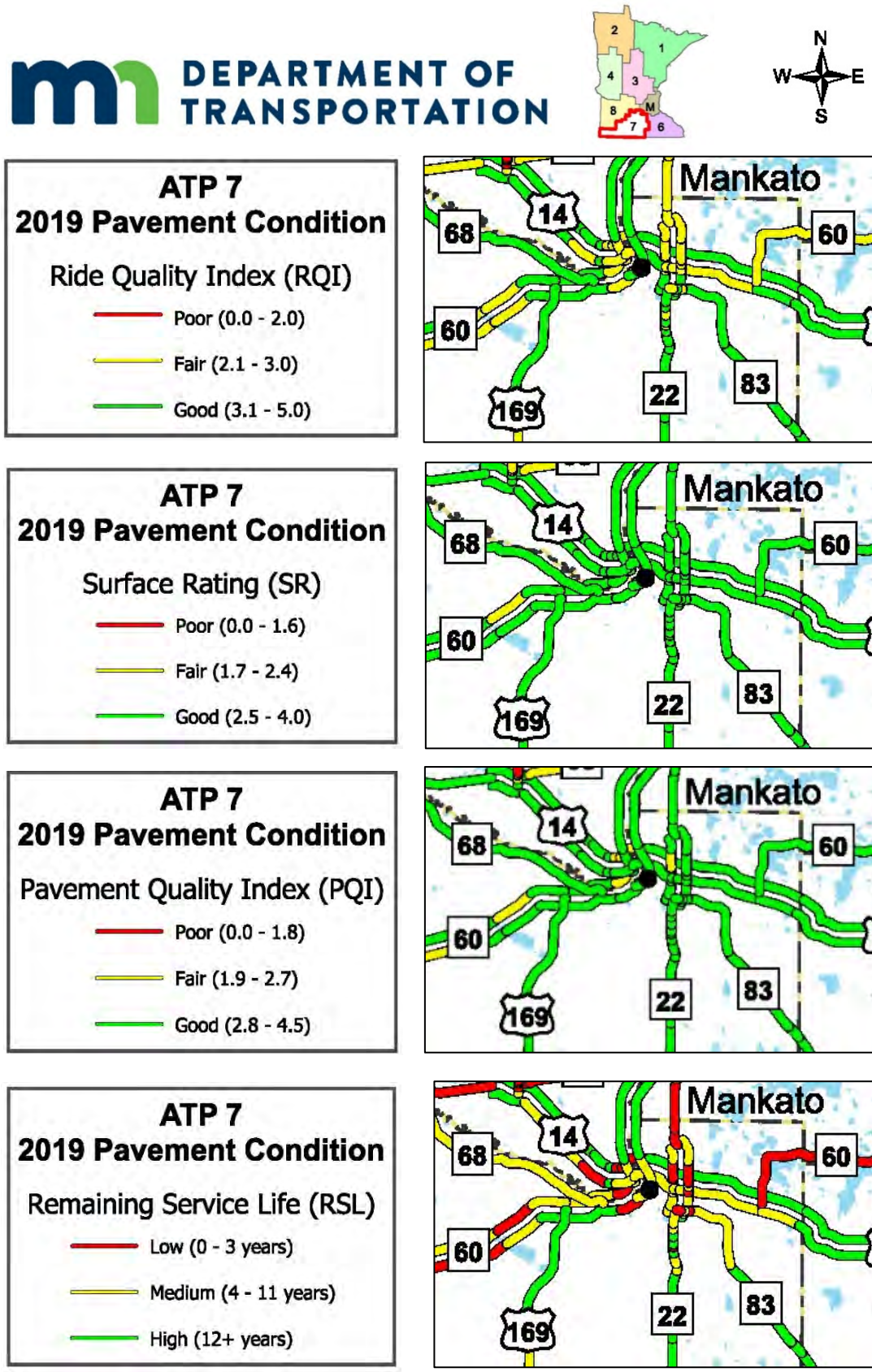
Table 10. Pavement Condition Indices		
Index	**Description**	**Rating Scale**
Ride Quality Index (RQI)	MnDOT's ride, or smoothness, index. RQI reflects the "seat of the pants" feeling the average user experiences traveling down the roadway.	RQI ratings range from 0.0 to 5.0, with 0.0 being considered very poor and 5.0 being considered very good.
Pavement Surface Rating (SR)	MnDOT uses SR to describe pavement distress. Pavement distresses are visible defects on the pavement surface. These defects are symptoms that indicate problems of pavement deterioration.	SR ratings range from 0.0 to 4.0. A higher SR rating indicates a road in better condition. A road with no defects is rated at 4.0. A road in need of major repair or rehabilitation will have an SR rating of near or below 2.5.
Pavement Quality Index (PQI)	MnDOT uses PQI as an overall measure of pavement condition, taking into account both smoothness and cracking	PQI ratings range from 0.0 to 4.5. A higher PQI rating indicates a better overall condition of the roadway.
Remaining Service Life (RSL)	RSL is an estimate, in years, until the RQI will reach a value of 2.5, which is generally considered the end of a pavement's design life. Most pavements will need some type of major rehabilitation when the RQI has reached 2.5	RSL is considered "high" when the number of years until reaching an RQI of 2.5 is 12 or more years. RSL is considered "low" when the number of years until reaching an RQI of 2.5 is 0 to 3 years.

Every year, the MnDOT Pavement Management Unit collects pavement roughness and digital image data of all the highways on the entire state trunk highway system. From this information, pavement condition indices are calculated and mapped for each MnDOT district. The pavement conditions along the Highway 169 study corridor are briefly described below and illustrated in **Figure 8**.

- The Ride Quality Index (RQI) along the study segment of Highway 169 ranges from fair (2.1 to 3.0) to good (3.1 to 5.0) conditions. The southbound lanes in the North and Middle Subareas are generally rated as "fair" and the South Subarea is rated "good". The northbound lanes of Highway 169 are rated as "good", with the exception of a portion of the Middle Subarea (see Figure 8). MnDOT's criterion for pavement preservation is generally an RQI between 2.5 to 3.0, depending on the type of roadway facility. As a result, there are future pavement preservation needs anticipated in the study area.
- The Pavement Surface Rating (SR) is consistently good (2.5 to 4.0) throughout the study corridor.

Figure 8. Highway 169 Study Corridor RQI and RSL

(Source: MnDOT Pavement Management Unit, 2019)



- The Pavement Quality Index (PQI) is generally good (2.5 to 4.0) throughout the majority of the study corridor. A short segment along southbound Highway 169 through Mankato/North Mankato was categorized as "fair" (1.9 to 2.7).
- The northbound lanes of Highway 169 in the South Subarea received a "good" rating for Remaining Service Life (RSL), meaning the pavement has 12-plus years of life. Portions on both northbound and southbound Highway 169 through the Middle Subarea have Remaining Service Life (RSL) ratings as "poor", meaning the pavement has less than 3 years of remaining service and is in need of improvements. The other segments of Highway 169 in the study area received "fair" (4 to 11 years) ratings, which indicate improvements are not needed in the short term but should be monitored for deteriorating conditions.

Planned Pavement Improvements

Within the Highway 169 corridor study area there is one programmed pavement improvement/preservation project scheduled for 2027, which is listed in the District 7 10-Year Capital Highway Investment Plan (2022-2031).

Additional Considerations: Social, Economic, and Environmental Factors

This section is intended to provide a high level description of the existing conditions and potential SEE factors within the Highway 169 study area that will need to be considered as concepts are developed and evaluated as part of the project development process. This section is not an in-depth analysis and the topics to be considered during future phases of project development will depend on the scope of planned projects and the type of funding being used, as a project may be required to undertake state and/or federal environmental review.

A more detailed inventory and assessment of the SEE factors associated with the study area can be found in the *"Highway 169 Environmental Screening Report" and the "Highway 169 Environmental Justice Analysis Report".*

An important social factor needing to be considered early in concept development is the presence of Environmental Justice (EJ) populations as all federal actions are required to comply with Executive Order 12898[1]. EJ populations are minority and/or low-income populations that are meaningfully greater than those of the general population. For EJ, "meaningfully greater" is defined as a minority or low-income population that is either 10 percent higher than the county average, or greater than 50 percent of the total geographic unit, or determined based on input from local officials or stakeholders.

Social

Based on a review of U.S. Census data – 2017 American Community Survey 5-year Estimates, there are minority and low-income EJ populations present in the corridor study area. Further determination will be needed on a project basis to determine if these populations have the potential to experience disproportional impacts as a result of a federal action or construction activity. Generally, permanent impacts of transportation projects are intended to improve the transportation corridor for all users. While future improvements to the Highway 169 corridor would unlikely disproportionately impact any of the identified environmental justice populations, a robust public/stakeholder engagement effort is strongly recommended in future stages of the project development process and prior to the evaluation of concepts.

Stakeholder Support

In 2019, the Highway 169 Corridor Study Project Management Team (PMT) was formed, which consists of representatives from the cities, counties, MnDOT, and FHWA. The PMT is tasked with guiding the

[1] https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf

study process and serving as a conduit to their governing bodies and constituents. A goal of the PMT is to develop a unified vision for transportation priorities/recommendations that are locally accepted in order to pursue funding and future municipal consent.

Economic

Highway 169 is an important route for commuters, tourists, and commercial freight travel across southwestern Minnesota. As shown in the traffic analysis section, the corridor continues to grow in use and travel demand, which along with safe and efficient access to commerce destinations (retail shops, restaurants, entertainment, office, and manufacturing/industry) are key factors in the long-term vitality of the local and regional economies.

Traffic counts collected through MnDOT and StreetLight® data from 2019 indicate that heavy commercial truck volumes account for approximately 8 to 15 percent of all daily traffic using Highway 169. This percentage of traffic is greater than the statewide average of approximately 8 percent on the state trunk highway system. As part of the project development process, a Project Management Team (PMT) was formed that consists of representatives from the local units of government (Mankato Area Planning Organization, MnDOT-District 7 Mankato, Blue Earth County, Nicollet County and Cities of North Mankato and Mankato). These stakeholders have mentioned Highway 169 as a critical connection to deliver goods to local businesses and throughout the region and state. Concerns have been raised that the existing highway facility is limiting potential growth and the efficient movement of heavy freight traffic. Operational and safety benefits for freight operators can translate into real dollar savings for businesses that ship items via commercial trucking. By reducing freight shipping costs, a real efficiency benefit can accrue to the business shipping the product, and a potential cost savings can be realized by the receiving business. Shipping cost savings can lower the overall product cost for consumers, in turn making local businesses more competitive compared with their outside competition, and better able to expand to new markets.

In addition to the business expansion benefit related to shipping cost savings, highway improvements can extend the market area that businesses can serve, as well as the areas from which they can access customers and/or suppliers. By extending the distance range over which local businesses effectively compete with their regional or state competitors can provide opportunities for substantial market expansion and attraction of manufacturing and distribution industries.

Investments in transportation-related improvements result in several types of economic impacts. The magnitude of the economic impact is most influenced by increased traffic speed and the relative change in travel time. Providing safe, reliable, and efficient travel along and across the Highway 169 corridor will promote economic competitiveness and expand employment opportunities for the local and regional economies.

Environmental/Natural Resources

A large portion of the study area lies within the river valleys of the Minnesota River and Blue Earth River. Several other sensitive water features and wetlands are scattered throughout the study area, which may influence the location and type of future infrastructure improvements. The concept development and evaluation processes for future projects will need to conduct an in-depth review and consideration of these features, along with assessing right of way needs and potential impacts to existing flood control structures, future flood risks, impacts to unique vegetation, prime farmlands, cultural/historic resources, soil and groundwater contamination, and threatened/endangered species.

IX. Study Goals and Objectives

Following the identification of issues and needs within the Highway 169 Corridor Study area, study partners developed the following Corridor Study goals:

X. Concept Identification and Evaluation

The study team developed a range of concepts based on the corridor's present and future issues. An Initial Concepts List was developed and then gradually screened and refined through public, agency, and stakeholder discussions. More information can be found in **Attachment D**.

XI. Initial Concepts List

The list below represents all concepts considered for each subarea. A discussion of concepts can also be seen in the Concept Traffic Operations Memorandum in **Attachment D (Appendix B).**

Northern Subarea

A. Signalized Green T intersection at eastbound Highway 14 exit ramp

B. Combine River Lane/Lind Street and maintain Webster Avenue

   i. Signalized intersection at River Lane/Lind Street and Webster Avenue
   ii. Roundabout intersections at River Lane/Lind Street and Webster Avenue
   iii. Signalized Reduced Conflict U-Turns (RCUTs) at River Lane/Lind Street and Webster Avenue

C. Combined intersection – Lind Street, River Lane, Webster Avenue

D. Highway 169/Highway 14 Interchange

   i. Full cloverleaf
   ii. Eliminate south loop with a signalized intersection
   iii. Eliminate south loop with a roundabout intersection
   iv. Diverging Diamond
   v. Roundabout ramp intersections

E. Local connection improvements

   i. Range Street remain open with modifications to lane striping/utilization
   ii. Range Street Right-In/Right-Out (RIRO) Intersection
   iii. Range Street cul-de-sac
   iv. Monroe Avenue – check sight distance and determine need for intersection

F. Pedestrian considerations

   i. Future trail connection across Highway 169 and Minnesota River using the existing Highway 14 bridge and including connections to Rex Macbeth Trail and the Minnesota River Trail
   ii. Possible new grade separated crossing north of Lind Street
   iii. Possible new grade separated crossing at Webster Avenue

Middle Subarea

A. Veteran's Memorial Bridge/Belgrade Avenue/Highway 169 Interchange

   i. Westbound lane reduction and pedestrian crossing improvements
   ii. Roundabout at western interchange ramp terminal

B. Riverfront Drive/Highway 169 Interchange

   i. Right Turn Lane Concept - Add channelized westbound right turn lane at northbound Highway 169 entrance ramp, tighten right turn, pedestrian crossing improvements, close local accesses off Riverfront Drive
   ii. Signalized Corridor Concept - Triple left from southbound Highway 169, additional eastbound through lane under the bridge which becomes a right turn lane at Poplar Street, additional entrance ramp lane for northbound Highway 169
   iii. Riverfront Drive West of Highway 169 Concept - Loop ramp from southbound Highway 169 eliminating access off Hubbell Avenue onto Riverfront Drive, roadway extension of 2nd Street from Owatonna Street to Hubbell Avenue and 3rd Street between Sibley Street and Hubbell Avenue, additional entrance ramp for northbound Highway 169

Southern Subarea

A. Section 1: Blue Earth River bridge to CR 33 (Hemlock Road)

   i. Concept A – Maintain 3/4 access at Hawley Street, restrict access at Amos Owen Lane and CR 33 by removing side street left turns (convert to RCUTs), install U turns between CR 33/McCauley Street and Amos Owen Lane/Hawley Street to accommodate lefts, potentially eliminate CR 33 access with new access south of Highway 68 or realign with Hemlock Road.
   ii. Concept B – eastbound right-in only at Hawley Street, restrict access at Amos Owen Lane and CR33 by removing side street left turns (convert to RCUT), install U turns between CR 33/Amos Owen Lane and Amos Owen Lane/Hawley Street to accommodate lefts, potentially eliminate CR 33 access with new access south of Highway 68 or realign with Hemlock Road.
   iii. Concept C – Full access signalized Green-T intersection at Hawley Street, restrict access at Amos Owen Lane by removing side street left turns (convert to RCUT), use U turn between CR 33/Amos Owen Lane to accommodate lefts, restrict access at CR 33 to RIRO
   iv. Concept D – Full access signalized Green-T intersection at CR 33, restrict access at Amos Owen Lane by removing side street left turns (convert to RCUT), install U turn between CR 33/Amos Owen Lane to accommodate lefts, restrict access at Hawley Street to RIRO
   v. Grade separated pedestrian crossings
      - Overpass at Hawley Street
      - Underpass at Blue Earth River Bridge

B. Section 2: Highway 68 to CR 90

   i. Concept A - Maintain existing access locations, construct High-T at Highway 68, restrict direct access to Highway 169 for businesses, restrict left turns at County Road 120 and CR 69, install U turn between County Road 120 and CR 69 to accommodate westbound left turn from T-943, close Bison Street access
   ii. Concept B1 – Construct High-T at Highway 68, consolidate access near CR 69 to provide better access spacing, construct connector roads to direct local traffic to new access location, close County Road 120 and Bison Street accesses
   iii. Concept B2 - Consolidate access between County Road 120 and CR 69 to provide better access spacing, construct connector roads to direct local traffic to new access location, close Bison Street access, reduce access at Highway 68 to RIRO
   iv. Concept C - Use RCUTs for County Road 120 and CR 69, add south leg to Highway 68 intersection, close Bison Street access

C. Section 3: CR 90 to the Highway 169/60 intersection

   i. Concept A - Close access at 208th Lane and Loren Drive, restrict northbound left turn at Highway 60/Highway 169 intersection, install U turns between Loren Drive/County Road 117 and west of Highway 60/Highway 169 intersection to accommodate lefts, reduce access at Gadwall Road to RIRO
   ii. Concept B - Realign access at Gadwall Road to provide better access spacing, close access at 208th Lane, Loren Drive and County Road 117, construct connector road to connect County Road 117 with the new Gadwall Road access location

XII. Early Concepts Screening

Table 11 below describes reasons for early dismissal of concepts that showed fatal flaws in comparison against the study's goals and objectives and purpose and need. The early screening process was conducted and documented by the PMT and shared with the public. The concepts dismissed below were not carried forward into the detailed concept evaluation. See **Attachment D (Appendix E)** for sketches of the dismissed concepts.

Table 11. Dismissed Concepts

Dismissed Concepts	Reason Dismissed*
Northern Subarea	
Signalized Green T at the eastbound Highway 14 exit ramp	• Early layout of this concept showed the northbound left turn lane to westbound Highway 14 located too close to the Highway 169 and eastbound Highway 14 exit ramp intersection. Specifically, the crossover between the eastbound left traffic from the eastbound Highway 14 exit ramp and the northbound left traffic at the westbound Highway 14 entrance ramp is a crash concern
Combined intersection – Lind Street, River Lane, Webster Avenue	• Concept is too impactful to existing businesses and future redevelopment areas and would require significant local road network reconfiguration
Southern Subarea	
Section 1 – Concept A: Maintain existing access, convert to RCUTs, modify geometry at Hawley Street to improve safety	• Operational issues – Westbound left turns at Hawley Street and at CR 33 operate with failing LOS
Section 1 – Concept B: Restrict access at Hawley Street, RCUTs at CR 33 and Amos Owen Lane	• Operational issues – Westbound left turns at CR 33 and westbound U-Turns at RCUTs operate with failing LOS

**The supporting traffic and safety analyses are documented in the Concept Traffic Operations Memo in Attachment D - Appendix B.*

XIII. Detailed Evaluation of Concepts

Following the early screening process, concepts carried forward were run through an evaluation matrix. Each subarea evaluation matrix scored concepts on their ability to achieve study goals and concept scores were compared to the no-build and each other to determine which perform best. The northern and southern subarea evaluation matrices are included in **Attachment D (Appendix A)**. Local system improvements and grade separated pedestrian crossing were also evaluated in the northern subarea. In addition, the southern subarea evaluated grade separated pedestrian crossings. Matrices for these can also be found on the following pages.

Study Goals and Objectives

Table 12 shows the study goals and objectives used for the detailed evaluation of concepts. Not all objectives were relevant to each subarea or evaluation of local system improvements. Refer to each

subarea matrix in **Attachment D (Appendix A)** for the objectives relevant to each subarea and concept.

Table 12. Study Goals and Objectives

Study Goals	Goal Objectives
Goal A: Preserve community connections and economic vitality.	• Maintain sustainable access for local trips into/out of Mankato and North Mankato • Maintain emergency access routes into/out of Mankato and North Mankato • Accommodate reasonable vehicle/truck access • Accommodate reasonable pedestrian/bicycle access • Enhance community identity
Goal B: Provide efficient and reliable mobility for all users.	• Provide acceptable system reliability serving existing and planned growth • Provide acceptable regional highway travel times while accommodating reliable local access • Provide acceptable side street delay • Improves side street delay over existing conditions • Understand and plan for freight needs • Meet access spacing guidelines • Improve access spacing guidelines over existing conditions • Provide a connected transportation system that accommodates trips consistent with roadway functional classification • Perceived pedestrian/bicyclist level of comfort • Accommodate future transit plans and needs • Understand and plan for roadway expansion
Goal C: Safely accommodate all system users.	• Reduce crash and severity rates • Provide safe pedestrian and bicycle travel near and across roadways, to area schools, and to regional destinations.
Goal D: Provide infrastructure improvements that respect the environment.	• Avoid, minimize, and mitigate impacts to sensitive environmental resources • Avoid, minimize, and mitigate impacts to hazardous contaminated areas • Disproportionate impact to Environmental Justice (EJ) populations
Goal E: Develop a financially responsible implementation plan.	• Right-size improvements to address needs yet maximize use of existing infrastructure where possible • Develop fiscally responsible improvements (construction costs) • Develop fiscally responsible improvements (right-of-way and environmental impact costs) • Develop project phases that meet schedule and funding constraints and maximize opportunities • Develop a supported funding model to clearly identify agency responsibilities • Position partner agencies to seek federal and state grants for identified improvements to minimize partner costs
Goal F: Develop a plan supported by all agency partners.	• Supported by the Project Management Team (PMT)

Additional Concepts Dismissed

After further traffic analysis, it was determined that the concepts below have concerning operational issues and the PMT decided to dismiss each. **Table 13** provides reasoning for concepts dismissed early.

Table 13. Additional Concepts Dismissed

Dismissed Concepts	Reason Dismissed*
Northern Subarea	
Highway 169/Highway 14 Interchange - Eliminate north loop with a roundabout intersection	• Operational issues - Maximum queues along exit ramp are anticipated to extend onto mainline Highway 14 and delay for the exit ramp movements operates with failing LOS
Highway 169/Highway 14 Interchange - Eliminate south loop with a roundabout intersection	• Operational issues - Maximum queues along exit ramp are anticipated to extend onto mainline Highway 14 and delay for the exit ramp movements operates with failing LOS

**The supporting traffic and safety analyses are documented in the Concept Traffic Operations Memo in Attachment D – Appendix B.*

The Middle Subarea

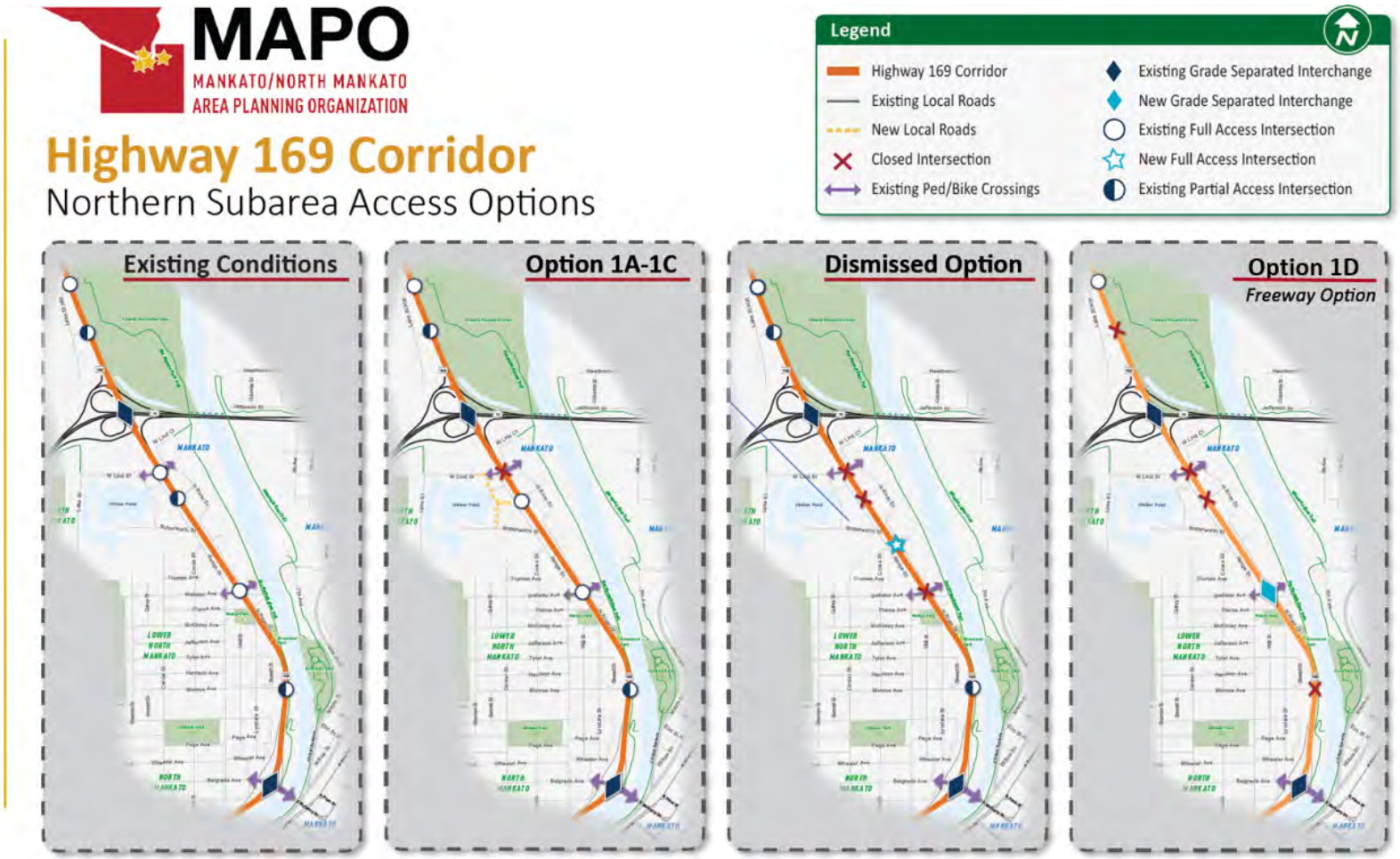
Concepts considered for the middle subarea included newly developed lower cost concepts and concepts identified in the previous Riverfront Drive and Belgrade Avenue Corridor Studies. In the early stage of the detailed concept evaluation, MnDOT announced the middle subarea would be best addressed through the scoping process of an upcoming Veterans Memorial Bridge project. MnDOT and the cities of Mankato and North Mankato will utilize the concepts developed for this subarea and engage in further analysis and public input to determine a preferred alternative for the upcoming project. For this reason, the middle subarea concepts were not carried through the detailed evaluation process. However, the PMT requested that concepts be documented for consideration in the upcoming MnDOT project scoping effort. See documented concepts in **Attachment D**.

XIV. Northern Subarea Evaluation

The following pages include images, descriptions, and summaries of scores for each concept. This also depicts how concepts were presented to the public. Full copies of the concept drawings can be seen on the MAPO website (www.mnmapo.org)

Figure 9 below provides a high-level overview for each Northern Subarea concept. Concepts 1A-1C all close Lind Street and relocate a full access intersection to North River Lane with either traffic signals, reduced conflict U-turns (RCUTS), or roundabouts. As discussed in Section III, Early Concept Screening, the study team looked at combining Lind Street, North River Lane, and Webster Avenue into one intersection but dismissed the idea because it was too impactful to businesses and properties to fit in the local road reconfigurations needed to support it. Concept 1D converts this section of Highway 169 into a freeway by completing the cloverleaf at the Highway 169/14 interchange and adding a grade separated interchange at Webster Avenue. Not shown in this graphic, but the study team also looked at other Highway 169/14 interchange improvements such as a ramp signal and a Diverging Diamond interchange. These other Highway 169/14 interchange improvements are shown on the follow pages and can be paired with a 1A-C concept.

Figure 9. Northern Subarea Access Concepts



Northern Subarea Concepts

No-Build Concept

With every transportation improvement study, a "no-build" concept is evaluated to justify the need for any improvement investments. The “no-build” or existing conditions concept is shown in **Figure 10**. This evaluation looks at what will happen over the next 20 years if no transportation improvements are made but the communities and region continue to grow as planned.

The “no-build” concept was evaluated against the study goals and given an overall score. The no-build scored very poorly with a negative score (-63 out of a possible 291 points) due to the many project goals it did not address. This justified to the study team that "doing nothing" is not a viable concept. The following is a high-level summary as to why. See the Traffic Operations Memo in **Attachment D (Appendix D)** for more details.

- 2040 traffic projections show excessive delays at the eastbound Highway 14 ramp during peak traffic hours.
- Five of seven intersections are spaced closer than MnDOT access spacing guidelines recommend
- There were a high number of crashes, 159 total with two severe, between 2015 and 2019. With anticipated traffic growth this would worsen.
- Crashes at the Lind Street intersection are more than three times the normal range for similar intersections.
- Local business access is very important in this subarea and council resolutions reinforce this.
- There is a demand for pedestrian and bicycle access across Highway 169 to connect the existing trail systems at Lind Street and Webster Avenue.

Figure 10. Northern Subarea No-Build

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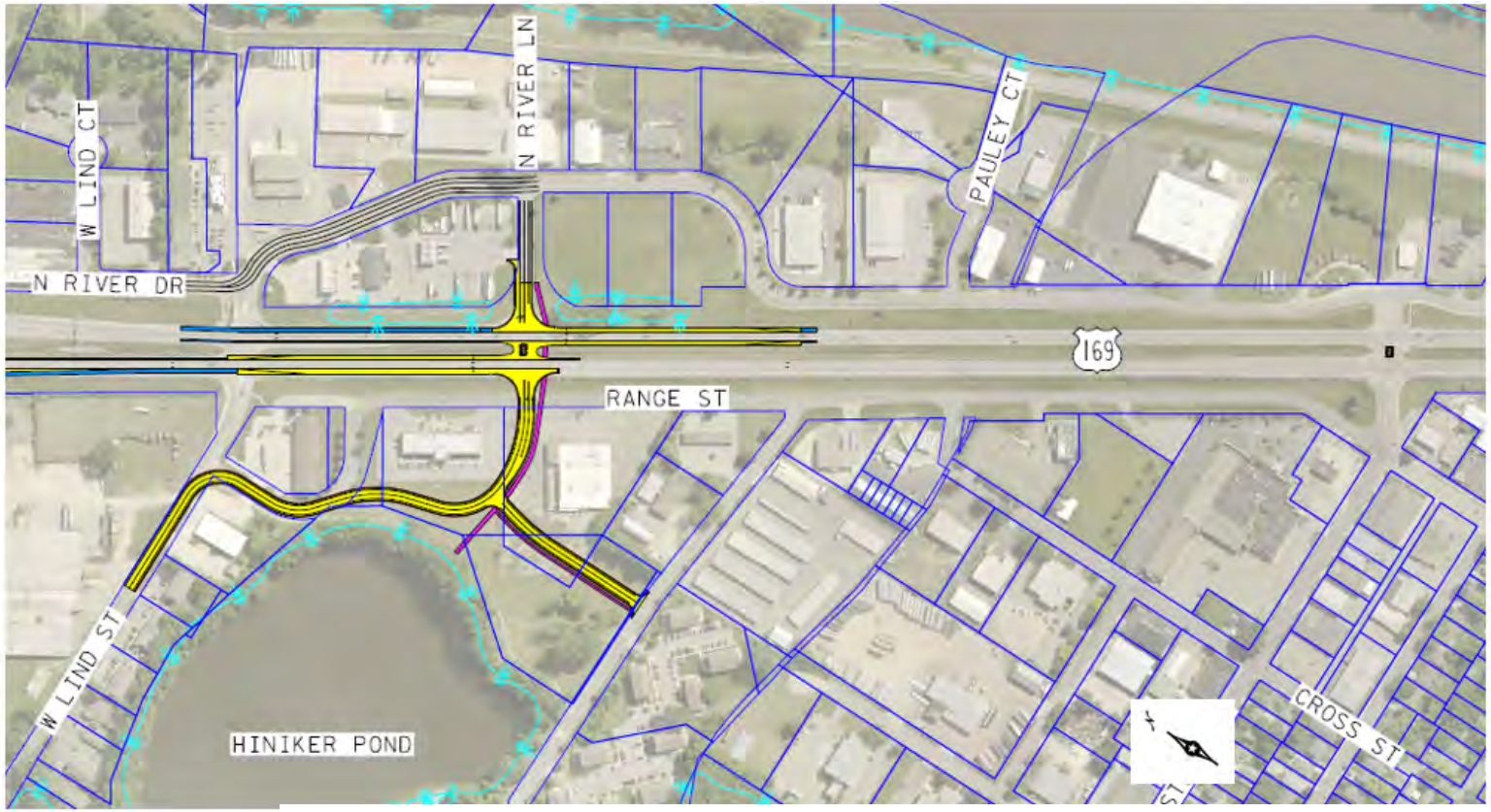
Northern Subarea Concepts

Concept 1A – Combine River Lane/Lind Street and Maintain Webster Avenue (Signals). Consistent with city resolutions.



CONCEPT EVALUATION

GOOD ++ FAIR + POOR -

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	+
Safety for all users	-
Community & environmental impacts	+
Fiscally responsible $3.7M	+
Agency support	++

SCORE 135

Summary of Evaluation:

Goal A: All movements are maintained at intersections accommodating reasonable access.

Goal B: Close access spacing to Highway 14 ramps. Average side street delay is increased from the no build scenario.

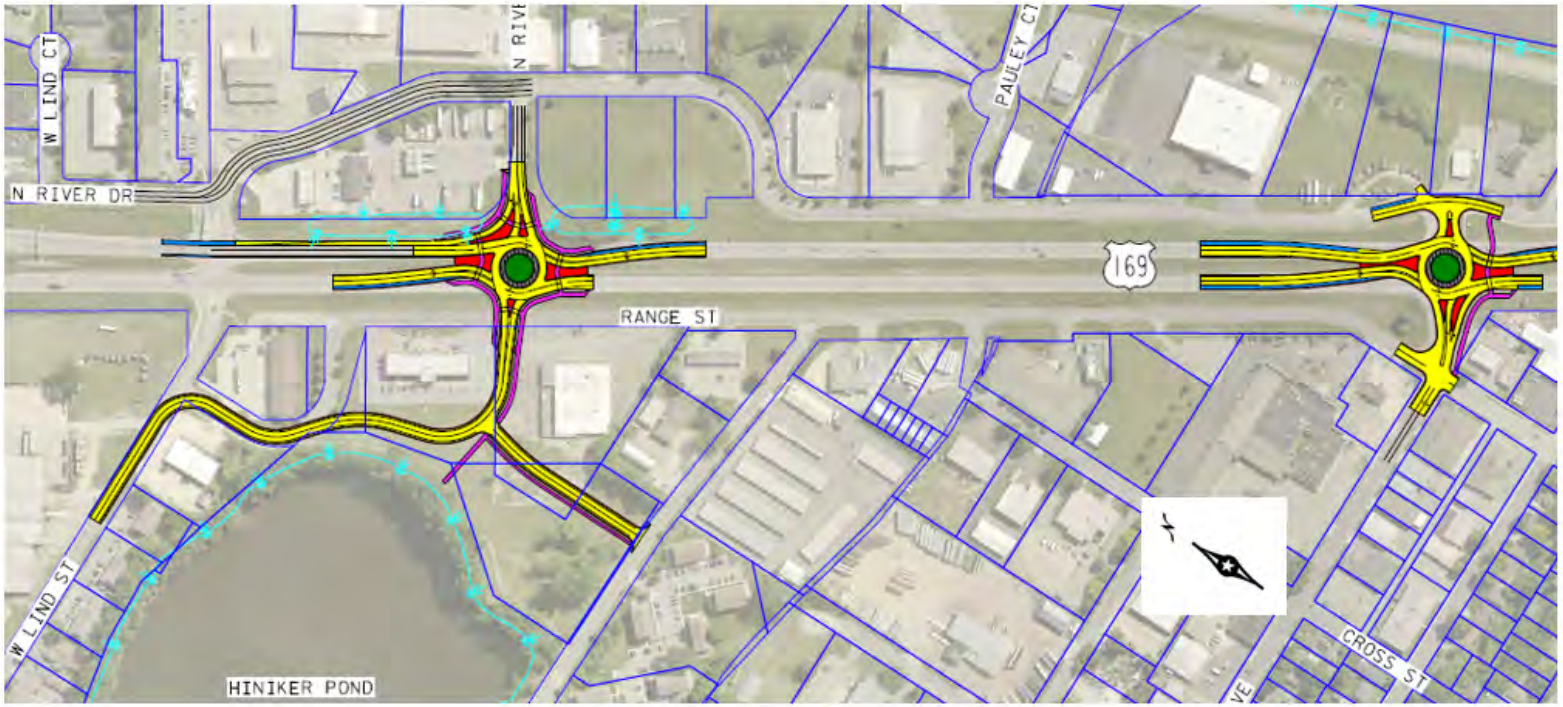
Goal C: Retaining traffic signal would not reduce crash/severity rates.

Goal D: New road alignment north of Hiniker Pond and Highway 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project. Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond.

Goal E: A fair fiscally responsible score is applied here because the concept's lack of addressing safety issues makes it less competitive for funding programs. Also, the cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 1B – Combine River Lane/Lind Street and Maintain Webster Avenue (Roundabouts). Consistent with city resolutions



CONCEPT EVALUATION

GOOD FAIR POOR

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	+
Safety for all users	++
Community & environmental impacts	+
Fiscally responsible $7.3M	++
Agency support	++

SCORE 202.5

Summary of Evaluation:

Goal A: All movements are maintained at intersections accommodating reasonable access. Median areas provide opportunity for aesthetics/monumentation.

Goal B: Close access spacing to Highway 14 ramps. Average side street delay is reduced from the no build scenario.

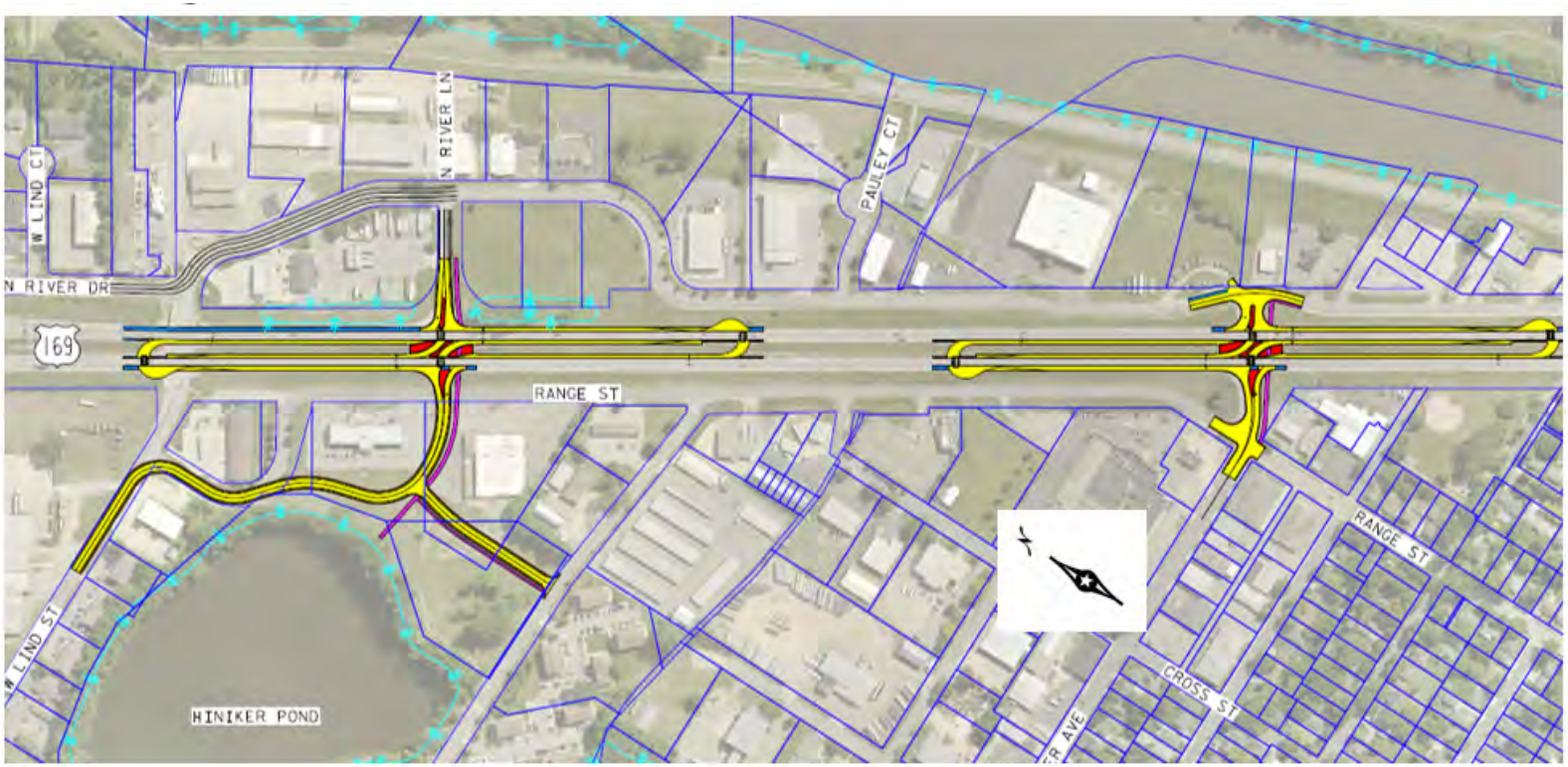
Goal C: Roundabouts reduce crash severity rates and pedestrian/vehicle conflict points.

Goal D: New road alignment north of Hiniker Pond and Highway 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project. Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond. Intersection improvements at both River Lane and Webster Avenue have larger disturbance footprint in this area.

Goal E: A good fiscally responsible score is applied here because the concept's ability to address safety issues makes it more competitive for funding programs. Also, the cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 1C – Combine River Lane/Lind Street and Maintain Webster Avenue (RCUTs). Not consistent with city resolutions.



Summary of Evaluation:

Goal A: Sightline concerns with plantings in RCUT medians. Side street movements are restricted so reasonable access is not perceived as being accommodated.

Goal B: Close access spacing to Highway 14 ramps. Average side street delay is the same as the no build scenario.

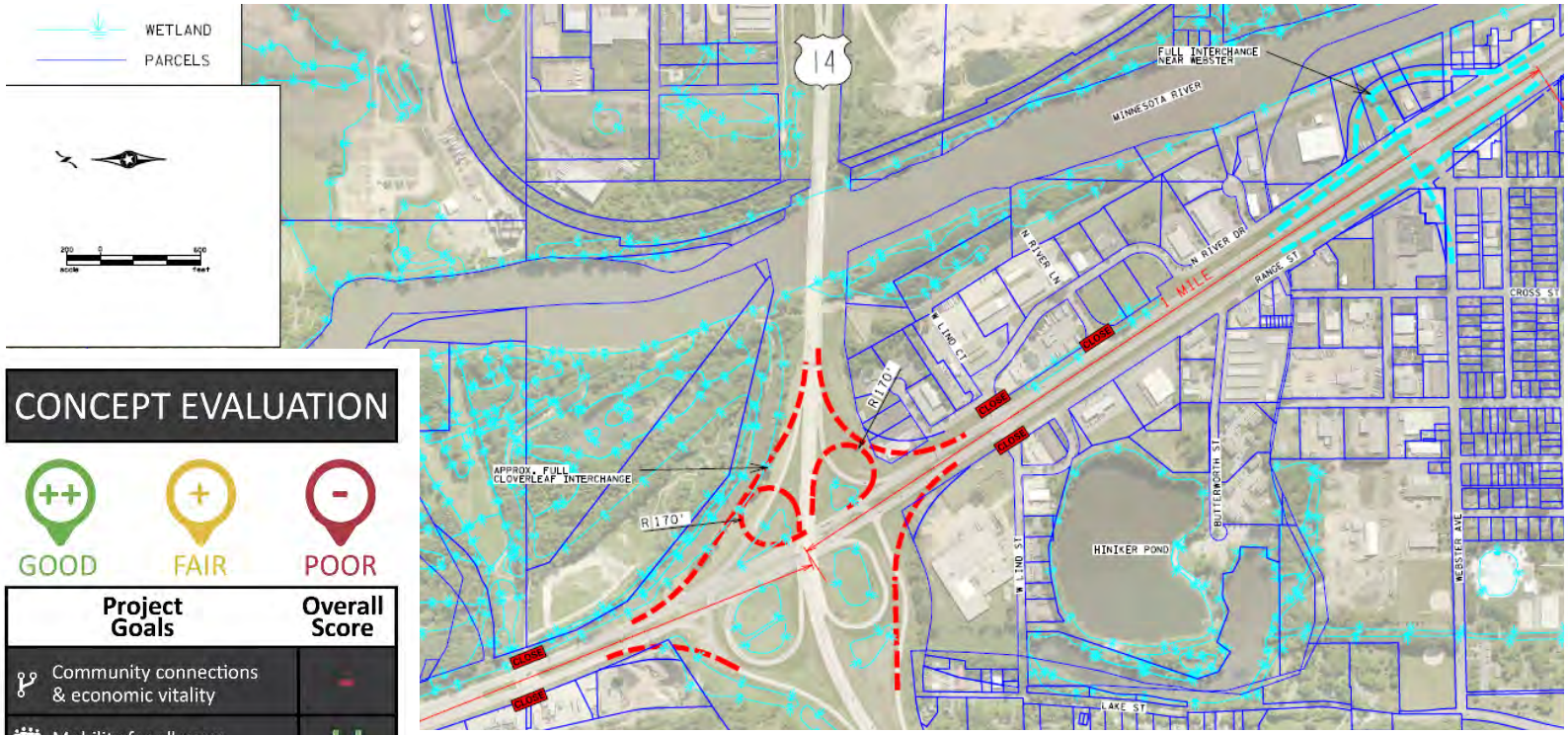
Goal C: RCUTs have been shown to reduce crash/severity rates. RCUTs are perceived as confusing for pedestrians and bicyclists.

Goal D: New road alignment north of Hiniker Pond and Highway 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project. Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond. Intersection improvements at both River Lane and Webster Avenue have larger disturbance footprint in this area.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 1D – Webster Ave Interchange and 2A – Highway 14/169 Interchange (Full Cloverleaf). Not consistent with city resolutions.



CONCEPT EVALUATION

GOOD ++ | FAIR + | POOR -

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	-
Fiscally responsible - $25M	-
Agency support	-

SCORE 156

CONCEPT EVALUATION

GOOD ++ | FAIR + | POOR -

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	++
Safety for all users	-
Community & environmental impacts	-
Fiscally responsible - $13M	-
Agency support	+

SCORE 31.5

Summary of Evaluation:

Goal A: Freeway will result in increased travel time from Highway 14 to area around McDonalds and Lind Street. Large cloverleaf footprint provides limited opportunities for aesthetic improvements.

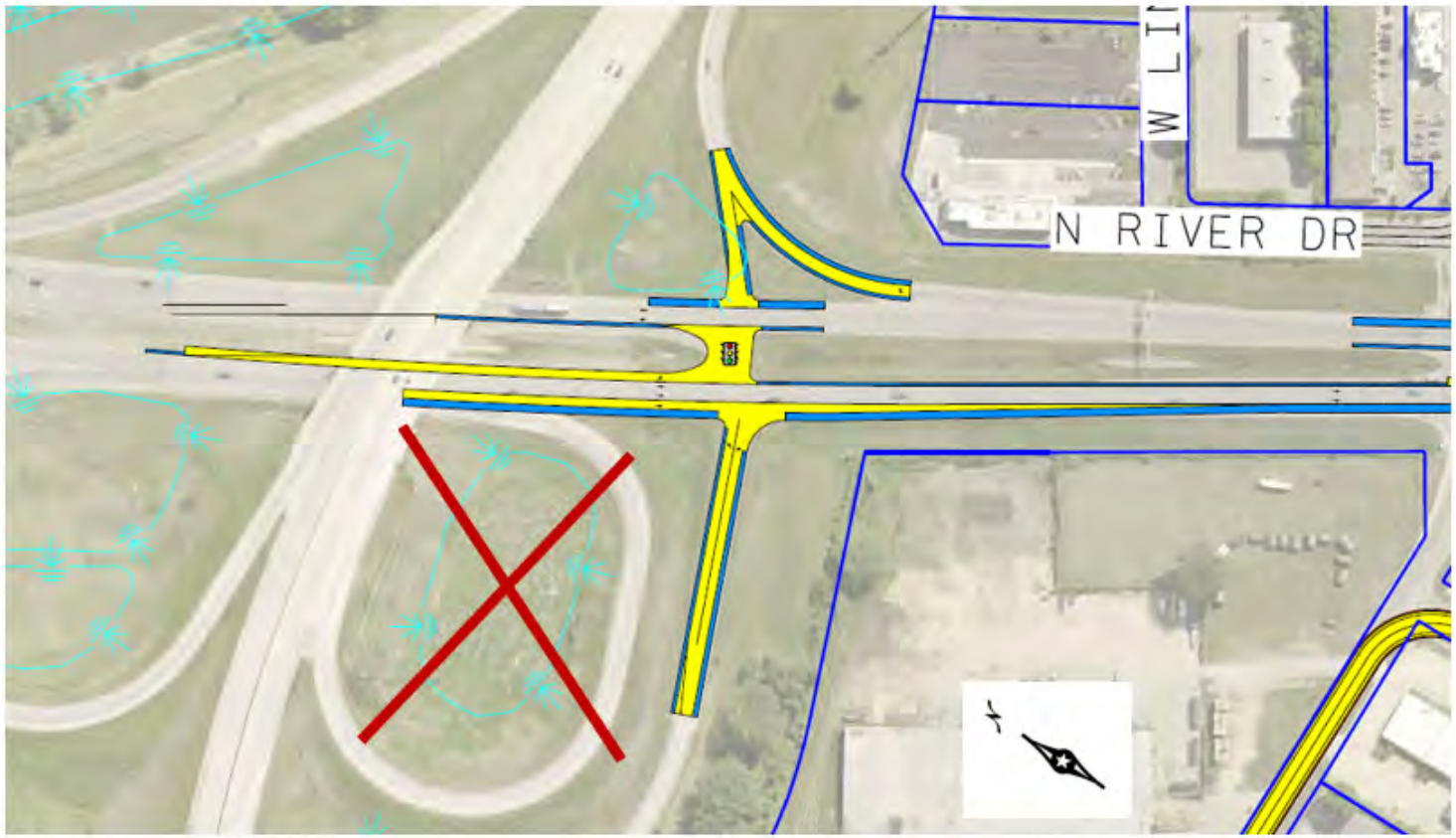
Goal C: Full cloverleaf introduces new weave areas.

Goal D: Highway 14 West to Highway 169 ramp would impact the existing wetland in the northeast quadrant. - Highway 169 North to Highway 14 East ramp would impact McDonald's building. - The full interchange configuration Concept 2A would warrant modifications to the Minnesota River levee that protects the City of Mankato and North Mankato from flood waters produced by the Minnesota River. Further coordination with FEMA will be required to understand the requirements associated with levee modifications or relocations associated with Concept 2A. - Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond. An interchange at Webster Avenue would have a larger disturbance footprint in this area. North Mankato Resolution No. No. R-19-0708-119 states at-grade access must be preserved at Webster Avenue. For this reason, this option would fail goal F, as it would not be supported by the PMT.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 2C – Highway 14/169 Interchange (Eliminate South Loop - Signal). Consistent with city resolutions.



CONCEPT EVALUATION		
GOOD (++)	FAIR (+)	POOR (-)

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	+
Community & environmental impacts	++
Fiscally responsible - $2.5M	++
Agency support	++

SCORE 183

Summary of Evaluation:

Goal B: Average side street delay is significantly reduced from the no build scenario.

Goal C: Increase in total number of crashes anticipated with adding traffic signal.

Goal D: Alone poses low risk and further evaluation needed relative to what it is paired with for improvements to the south.

*Goal A and E showed minimal to no differentiating impact.

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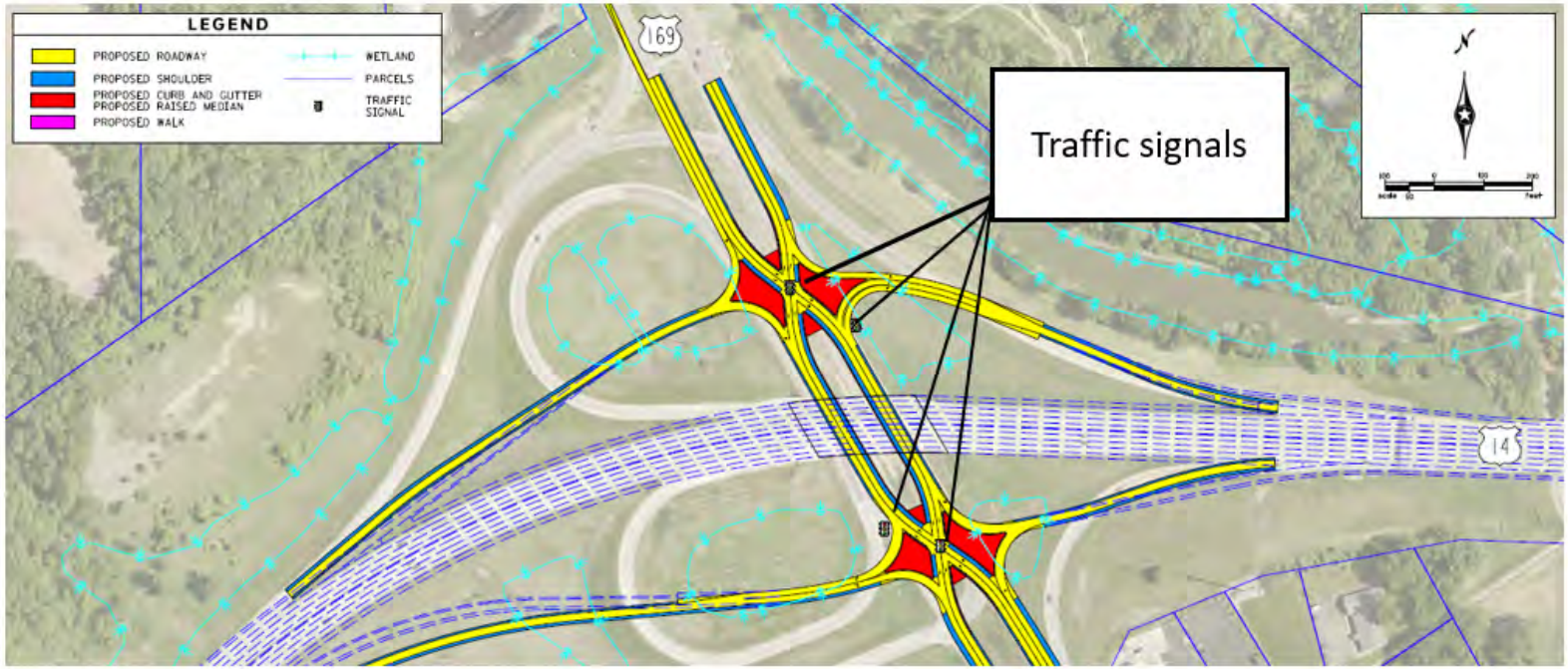
Northern Subarea Concepts

Concept 2D – Highway 14/169 Interchange (Diverging Diamond). Consistent with city resolutions.



CONCEPT EVALUATION

	GOOD	FAIR	POOR
Project Goals			Overall Score
Community connections & economic vitality			++
Mobility for all users			++
Safety for all users			+
Community & environmental impacts			++
Fiscally responsible - $9M			++
Agency support			++

SCORE 193.5

Summary of Evaluation:

Goal A: Median areas provide opportunity for aesthetics/monumentation, but sightline concerns may limit this.

Goal B: Average side street delay is significantly reduced from the no build scenario.

Goal C: Increase in total number of crashes anticipated with adding traffic signals.

Goal D: Highway 14 West to Highway 169 ramp would impact the existing wetland and flood levee. Further coordination with FEMA will be required to understand the requirements associated with levee modifications or relocations.

Goal E showed minimal to no differentiating impact.

Northern Subarea Local System Improvements

Concept L1 – Range Street Remains Open (No Change). Consistent with city resolutions.

This concept would leave Range Street as it is today. The score is similar to Concept L4 on page 62. The main evaluation points include:

- Goal A: Maintains access for local trips and emergency routes (relative to Highway 169 improvement paired with).
- Goal C: Existing crash issues will continue (relative to Highway 169 improvement paired with).

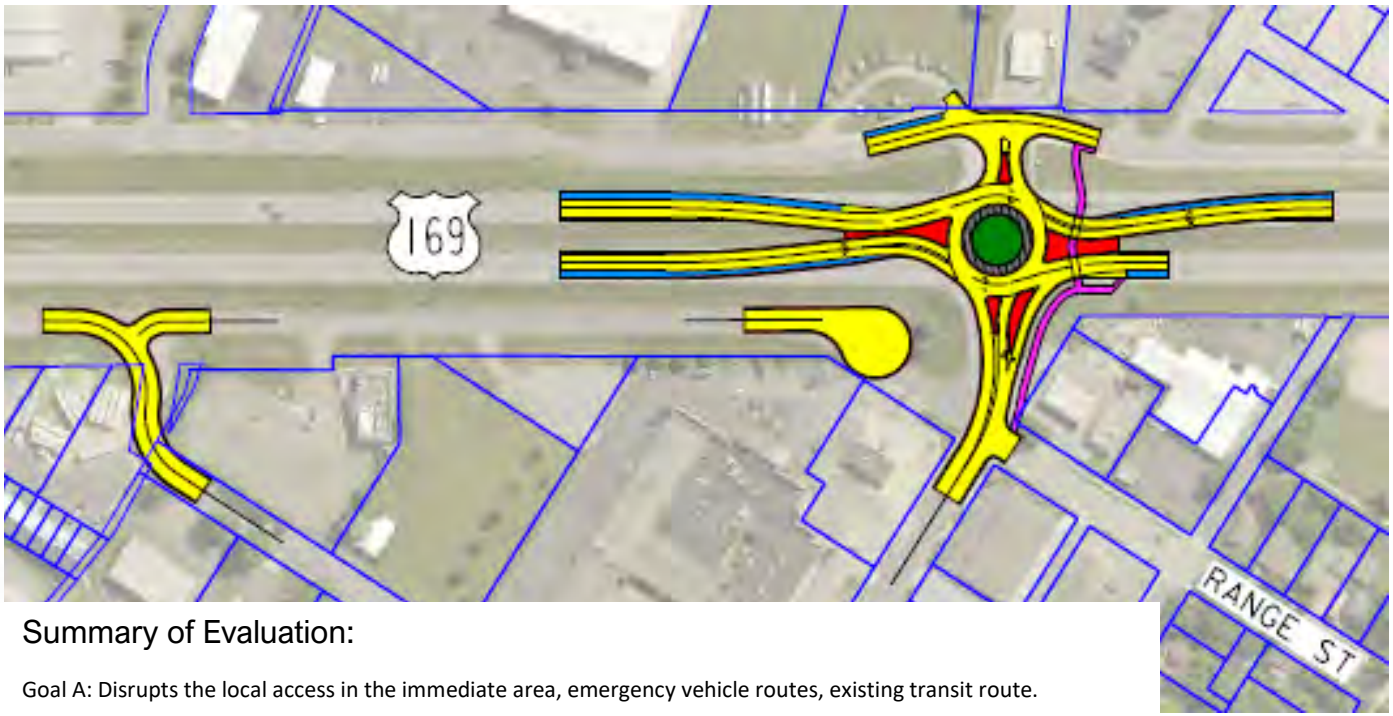
Northern Subarea Local System Improvements

Concept L2 – Range Street Cul-de-sac. Not consistent with city resolutions.

CONCEPT EVALUATION

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	-
Safety for all users	++
Community & environmental impacts	++
Agency support	-

SCORE -24



Summary of Evaluation:

Goal A: Disrupts the local access in the immediate area, emergency vehicle routes, existing transit route.

Goal C: Crash reduction anticipated with reduced access.

Goal B, D, and E showed minimal to no differentiating impact.

Northern Subarea Local System Improvements

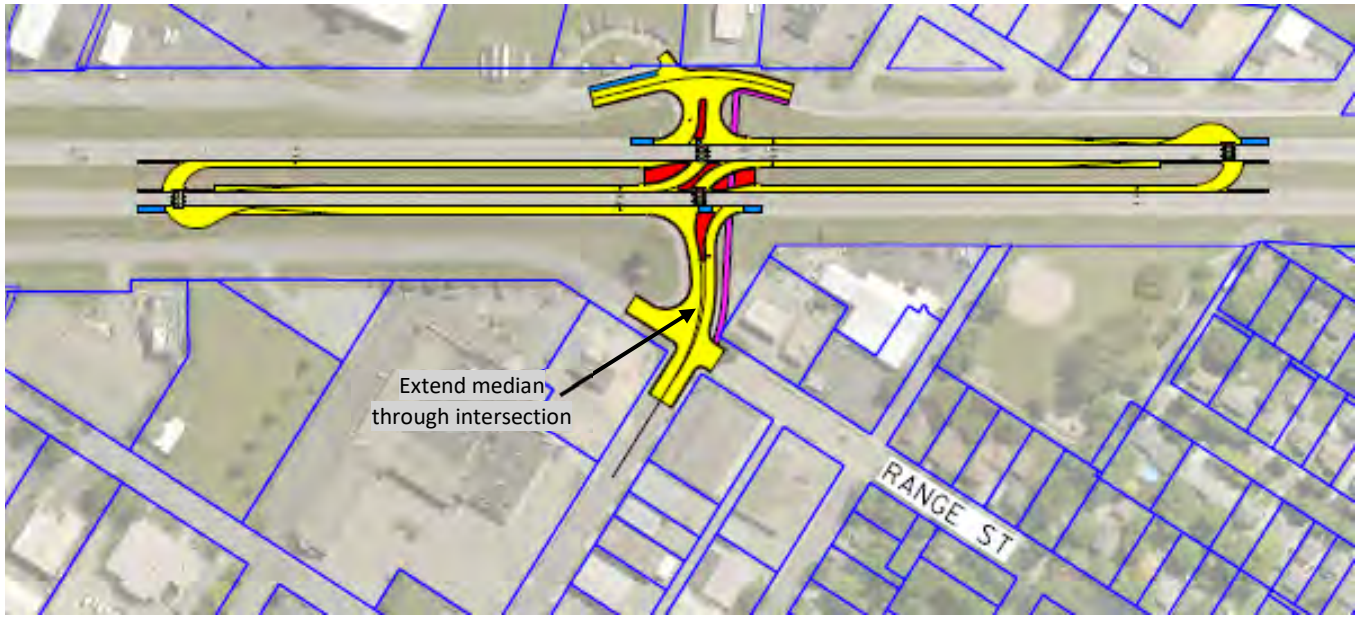
Concept L3 – Range Street Right-In/Right-Out. Not consistent with city resolutions.

CONCEPT EVALUATION

GOOD (++) FAIR (+) POOR (-)

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	+
Safety for all users	-
Community & environmental impacts	++
Agency support	++

SCORE 24



Summary of Evaluation:

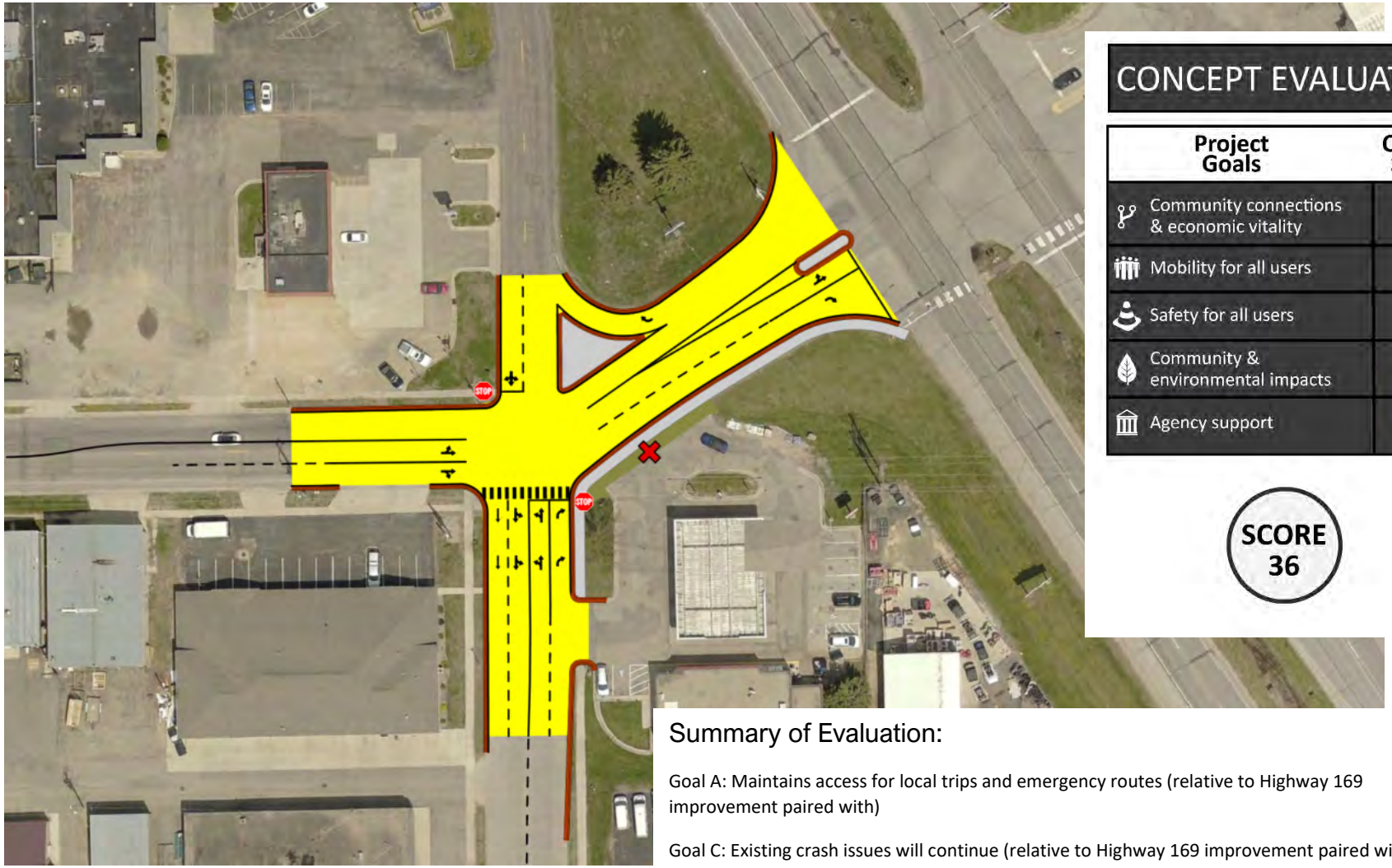
Goal A: Limits local access in the immediate area and emergency vehicle routes.

Goal C: Crash reduction anticipated with reduced access.

Goal B, D, and E showed minimal to no differentiating impact.

Northern Subarea Local System Improvements

Concept L4 – Range Street Modernization. Consistent with city resolutions.



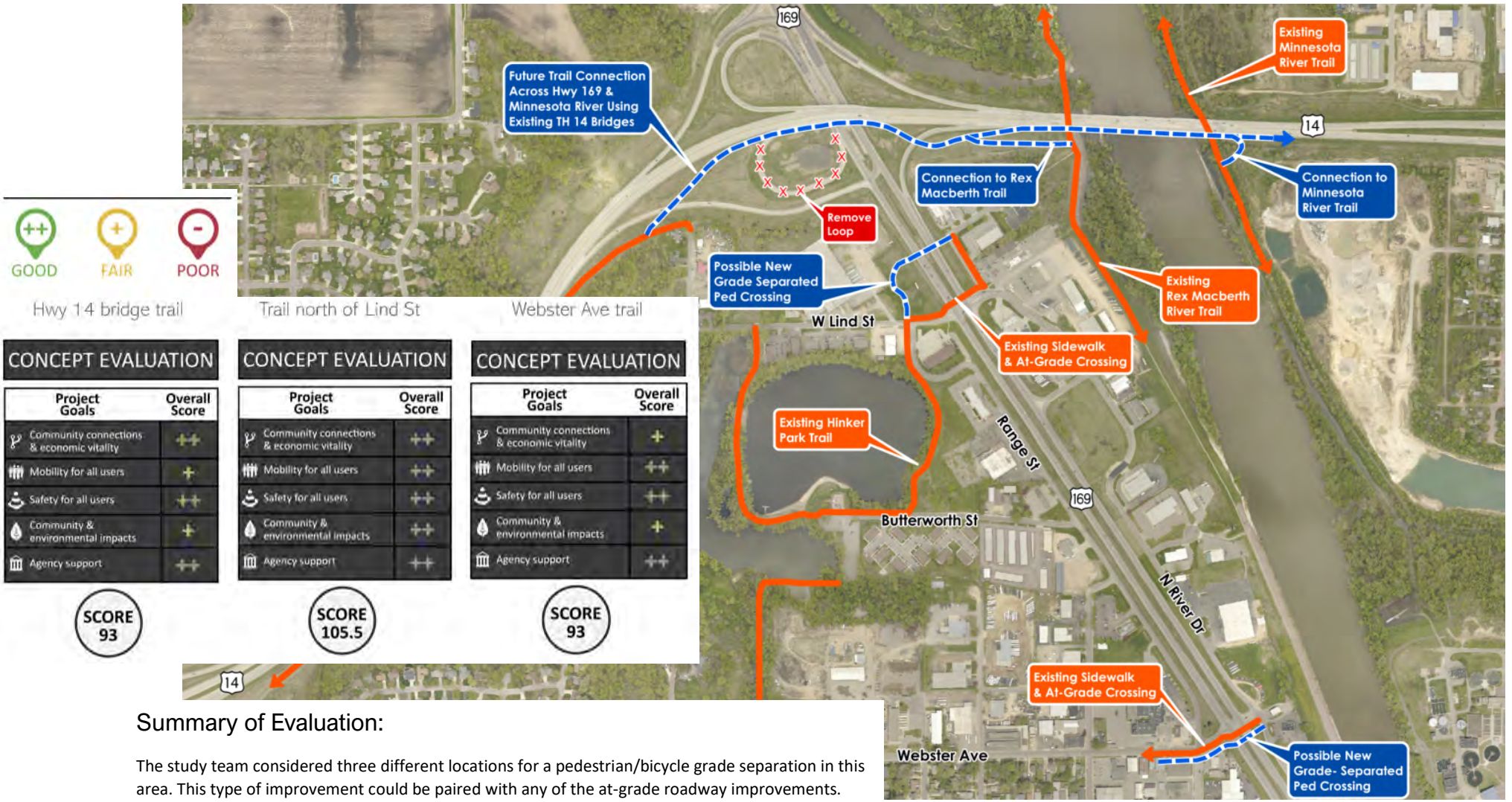
Summary of Evaluation:

Goal A: Maintains access for local trips and emergency routes (relative to Highway 169 improvement paired with)

Goal C: Existing crash issues will continue (relative to Highway 169 improvement paired with)

Goal B, D, and E showed minimal to no differentiating impact.

Northern Subarea Grade Separated Crossings



Summary of Evaluation:

The study team considered three different locations for a pedestrian/bicycle grade separation in this area. This type of improvement could be paired with any of the at-grade roadway improvements. We considered a grade separation at Webster Avenue, Lind Street, and adjacent to Highway 14.

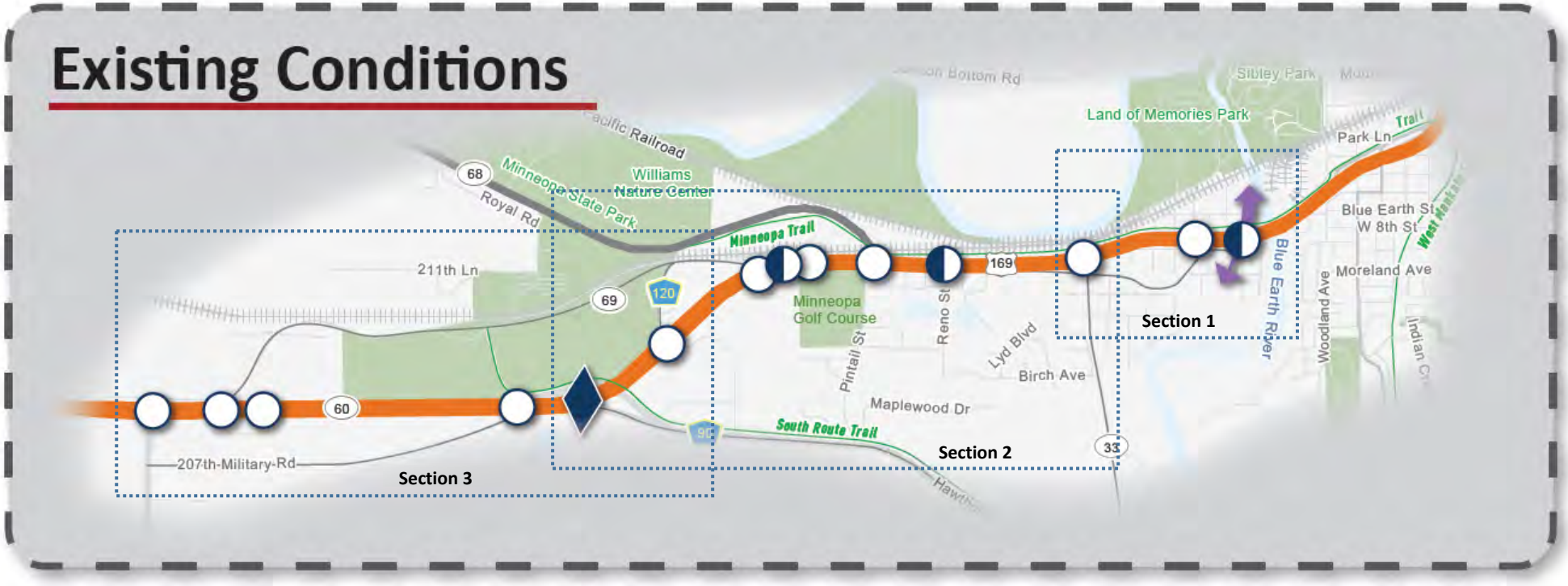
Both the Highway 14 bridge and Lind Street concepts scored the highest as they seemed to make the most natural connection between the Bluff Valley Trail and Rex MacBeth Trail for recreational users. These concepts also serve the pedestrian demand for access to convenience stores located east of Highway 169 and residential land uses west of Highway 169 near Lind Street.

XV. Southern Subarea Evaluated Concepts

The following pages include images, description, and summary of scores for each concept. This also depicts how concepts were presented to the public. Full copies of the concept drawings can be seen on the MAPO website (www.mnmapo.org)

As shown in **Figure 11**, for ease in describing key corridor/network needs the subarea area was split into three sections based on the unique context within each. The study team looked at several lower cost/high benefit solutions to address the existing and anticipated future needs based on current area planning documents. The study team also explored and evaluated future scenarios that are opportunity driven if unplanned growth in the area occurs.

Figure 11. Southern Subarea Existing Conditions and Sections



Southern Subarea Concepts

No-Build Concept

A southern subarea “no-build” concept was also evaluated against the study goals and given an overall score. The no-build concept is shown in **Figure 12**. The no-build scored very poorly with a negative score (-93 out of a possible 252 points) due to the many project goals it did not address. This justified to the study team that "doing nothing" is not a viable concept. The following is a high-level summary as to why. See the Traffic Operations Memo in **Attachment D** - **Appendix B** for more details.

- 2040 traffic projections show back-ups particularly bad at WB left turn lane at Hwy 60, CR 69 (Hawley Street) and excessive delay at Highway 60 and CR 33 during the evening peak hours.
- Five of seven intersections are spaced closer than MnDOT access spacing guidelines allow
- There were a high number of crashes, 171 total with seven severe, between 2015 and 2019. Fatal crashes have occurred at CR 90, CR 69, Highway 68, and CR 69 (Hawley Street).
- There is a demand for pedestrian and bicycle access across Highway 169, at Hawley Street, to connect existing neighborhoods to a local convenience store.

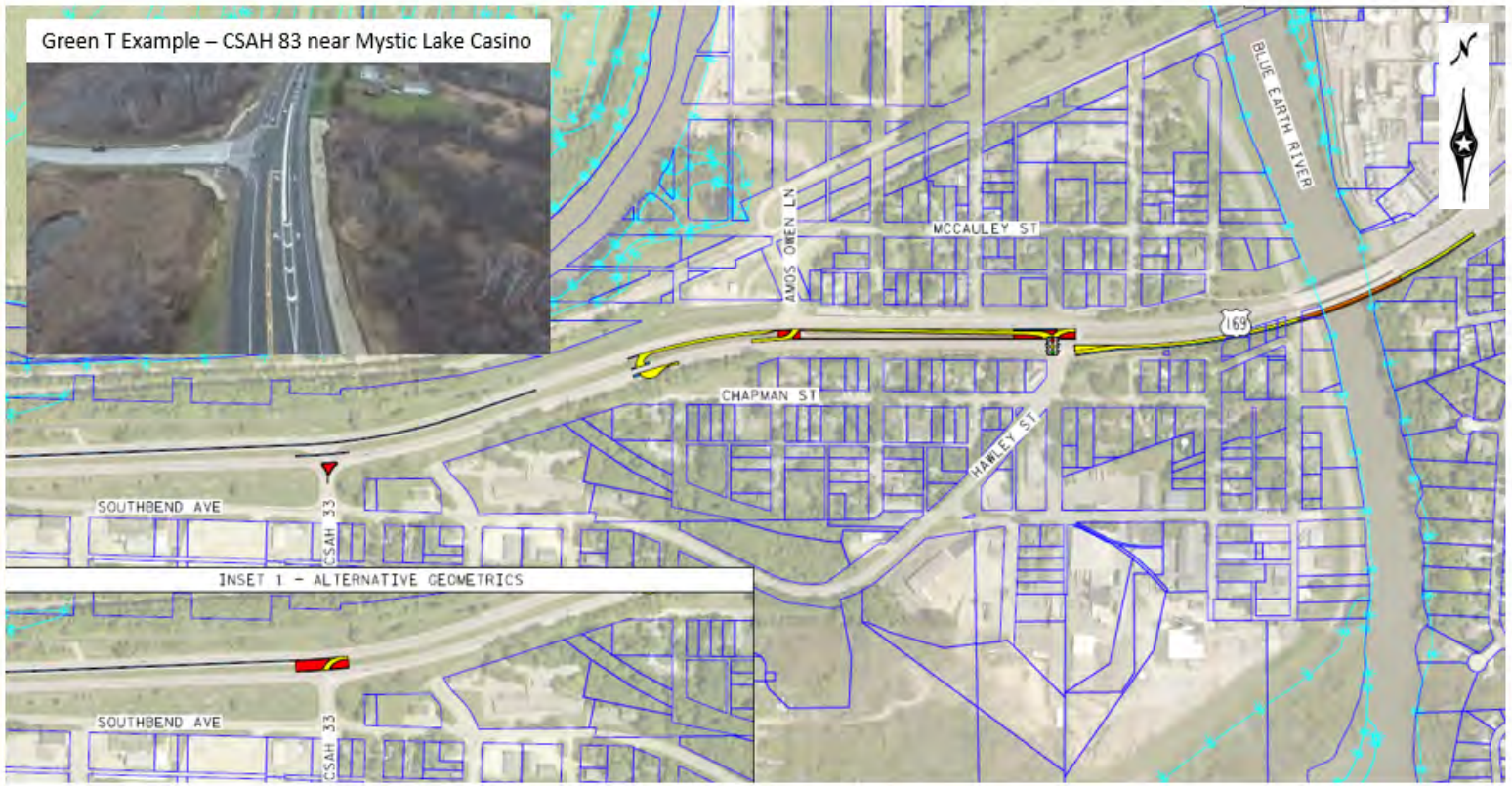
Figure 12. Southern Subarea No-Build Concept

MAPO MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION

Real People. Real Solutions.

Southern Subarea Concepts

Section 1: Concept 1C



CONCEPT EVALUATION

GOOD FAIR POOR

Project Goals*	Overall Score
Community connections & economic vitality*	+
Mobility for all users*	++
Safety for all users	+
Community & environmental impacts	++
Fiscally responsible - $5.1M	++
Agency support	++

*With Pedestrian Bridge

SCORE 67.5

Summary of Evaluation:

Goal A: Limits CR 33 and Amos Owen Lane neighborhood access.

Goal B: Acceptable operations with all WBLs (Hawley Street and CR 33) at signalized Green T (Hawley Street). Does not address access spacing.

Goal C: Requires pedestrians to cross multiple lanes of traffic. Green-T would reduce severe crashes but increase rear end crashes with signal added along Highway 169.

Goal D: Low risk impact due to ability to construct improvements in existing right-of-way footprint.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Southern Subarea Concepts

Section 1: Concept 1D

CONCEPT EVALUATION

++ GOOD + FAIR - POOR

Project Goals*	Overall Score
Community connections & economic vitality*	++
Mobility for all users*	++
Safety for all users	+
Community & environmental impacts	++
Fiscally responsible - $4.7M	++
Agency support	++

*With Pedestrian Bridge

SCORE 61.5

Summary of Evaluation:

Goal A: Limits Hawley Street and Amos Owen Lane neighborhood access.

Goal B: Acceptable operations with all WBLs (Hawley Street and CR 33) at signalized Green T (CR 33). Does not address access spacing.

Goal C: Requires pedestrians to cross multiple lanes of traffic. Green-T would reduce severe crashes but increase rear end crashes with signal added along Highway 169.

Goal D: Low risk impact due to ability to construct improvements in existing right-of-way footprint.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Southern Subarea Concepts

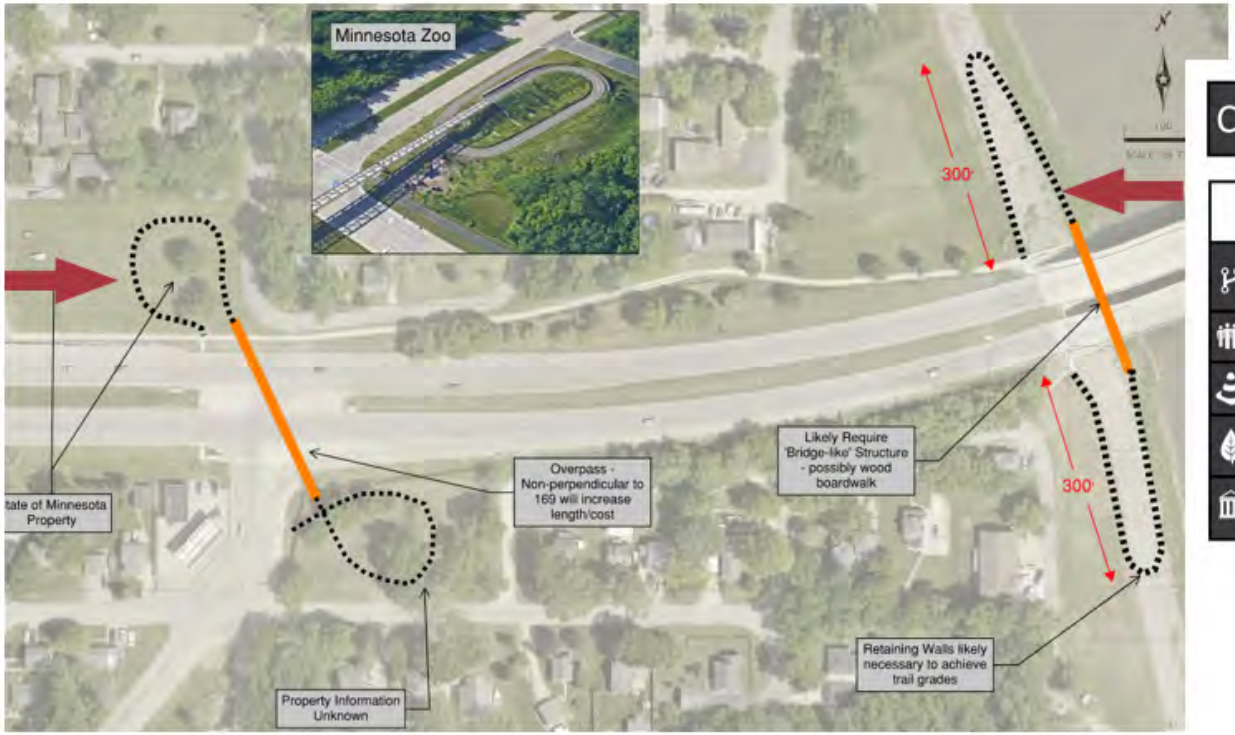
Section 1: Grade Separated Pedestrian Crossing Concepts

CONCEPT EVALUATION

++ GOOD + FAIR - POOR

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	++
Agency support	++

SCORE 102



CONCEPT EVALUATION

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	++
Agency support	+

SCORE 78

Summary of Evaluation:

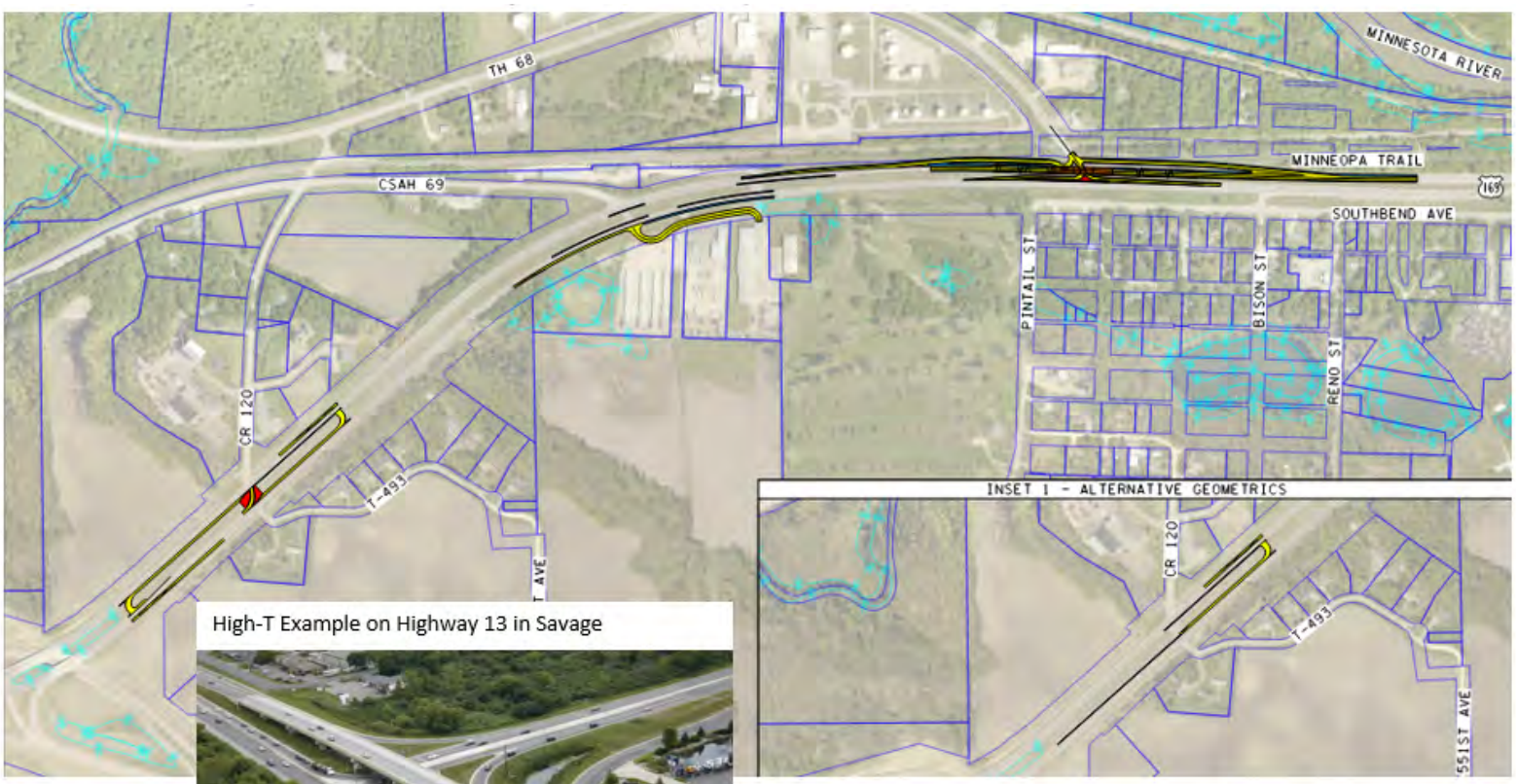
Goal A: The concept near Hawley Street would best serve existing demand for people to walk and bike across Highway 169 to and from the Quick Mart at the southwest quadrant of the intersection.

Goal D: The Hawley Street option would go over 169. This shows the footprint needed for the bridge and ramps that are accessible for all abilities. This is utilizing state owned land on the north and undeveloped section on the south.

Goal B, C and E showed minimal to no differentiating impact.

Southern Subarea Concepts

Section 2: Concept 2A



High-T Example on Highway 13 in Savage

CONCEPT EVALUATION

GOOD ++ FAIR + POOR -

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	++
Fiscally responsible- 22.2M	+
Agency support	++

SCORE 154.5

Summary of Evaluation:

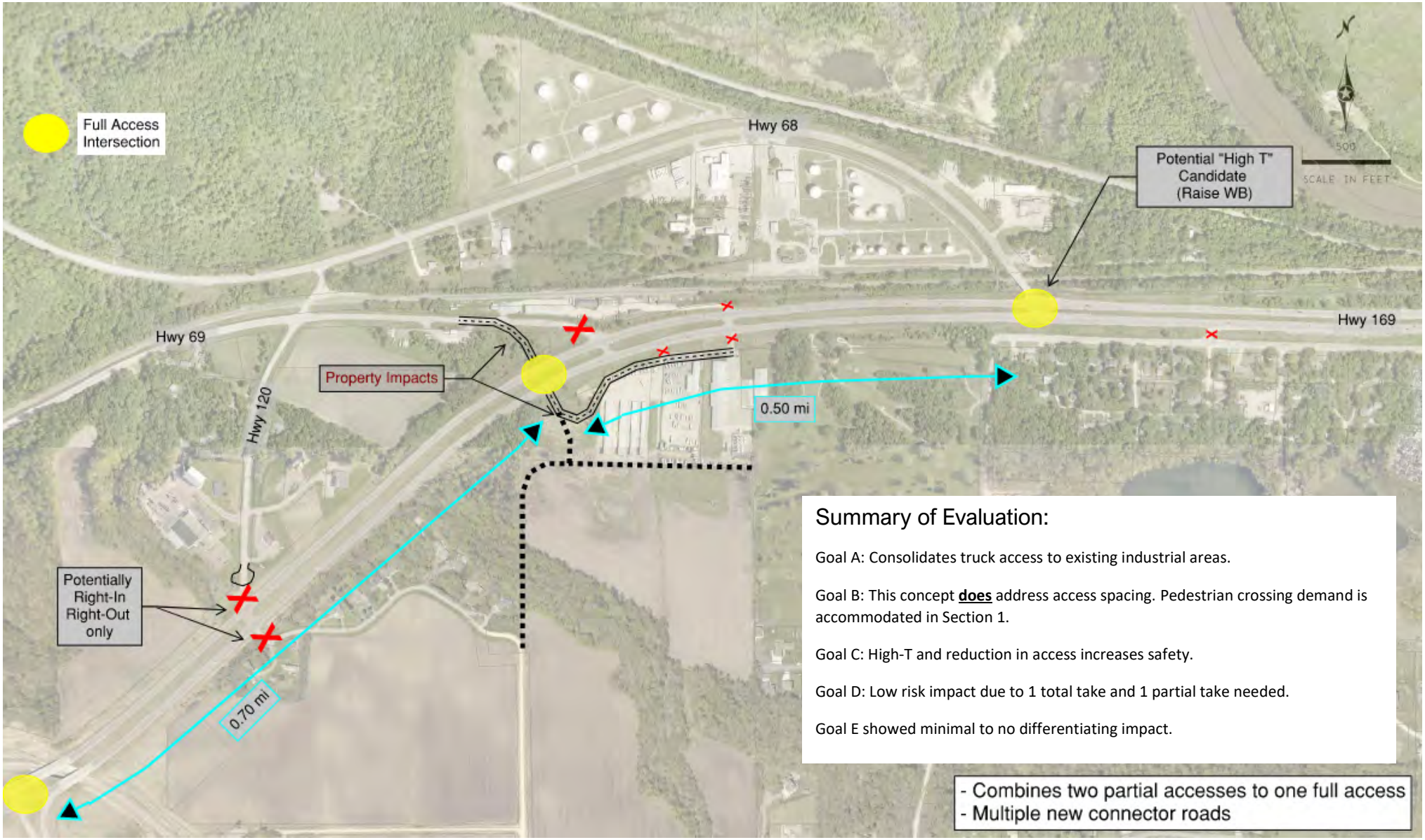
Goal A: Provides good local access.

Goal B: Does not meet access spacing guidelines. Pedestrian crossing demand is accommodated in Section 1.

Goal C: High-T and reduction in access increases safety.

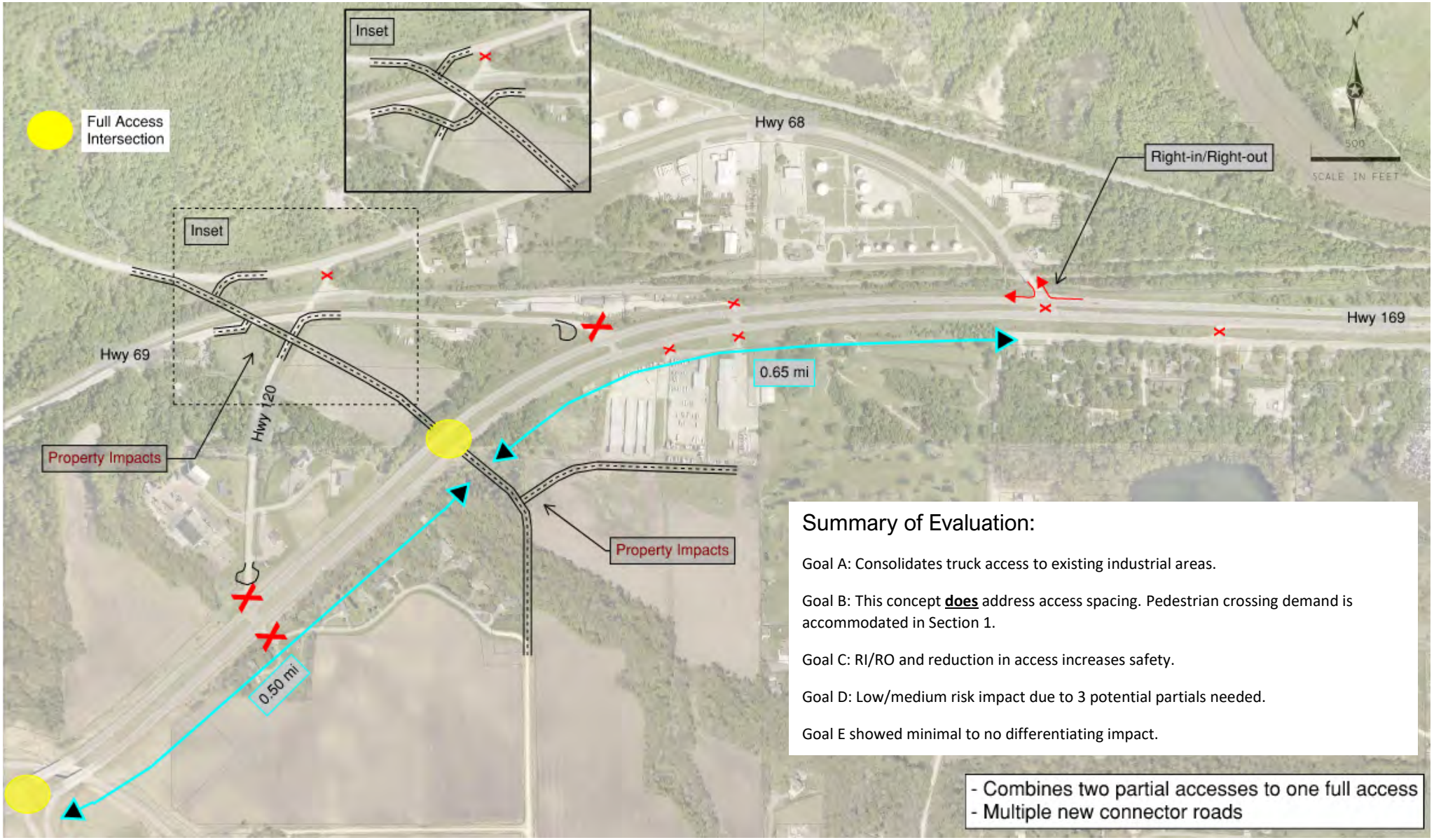
Goal D: Low risk impact due to 1 partial take needed south of CR 69.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.


Full Access Intersection
Hwy 68
Potential "High T" Candidate (Raise WB)
500
SCALE IN FEET
Hwy 69
Hwy 120
Hwy 169
Property Impacts
0.50 mi
Potentially Right-In Right-Out only
0.70 mi
Summary of Evaluation:
Goal A: Consolidates truck access to existing industrial areas.
Goal B: This concept does address access spacing. Pedestrian crossing demand is accommodated in Section 1.
Goal C: High-T and reduction in access increases safety.
Goal D: Low risk impact due to 1 total take and 1 partial take needed.
Goal E showed minimal to no differentiating impact.
- Combines two partial accesses to one full access
- Multiple new connector roads

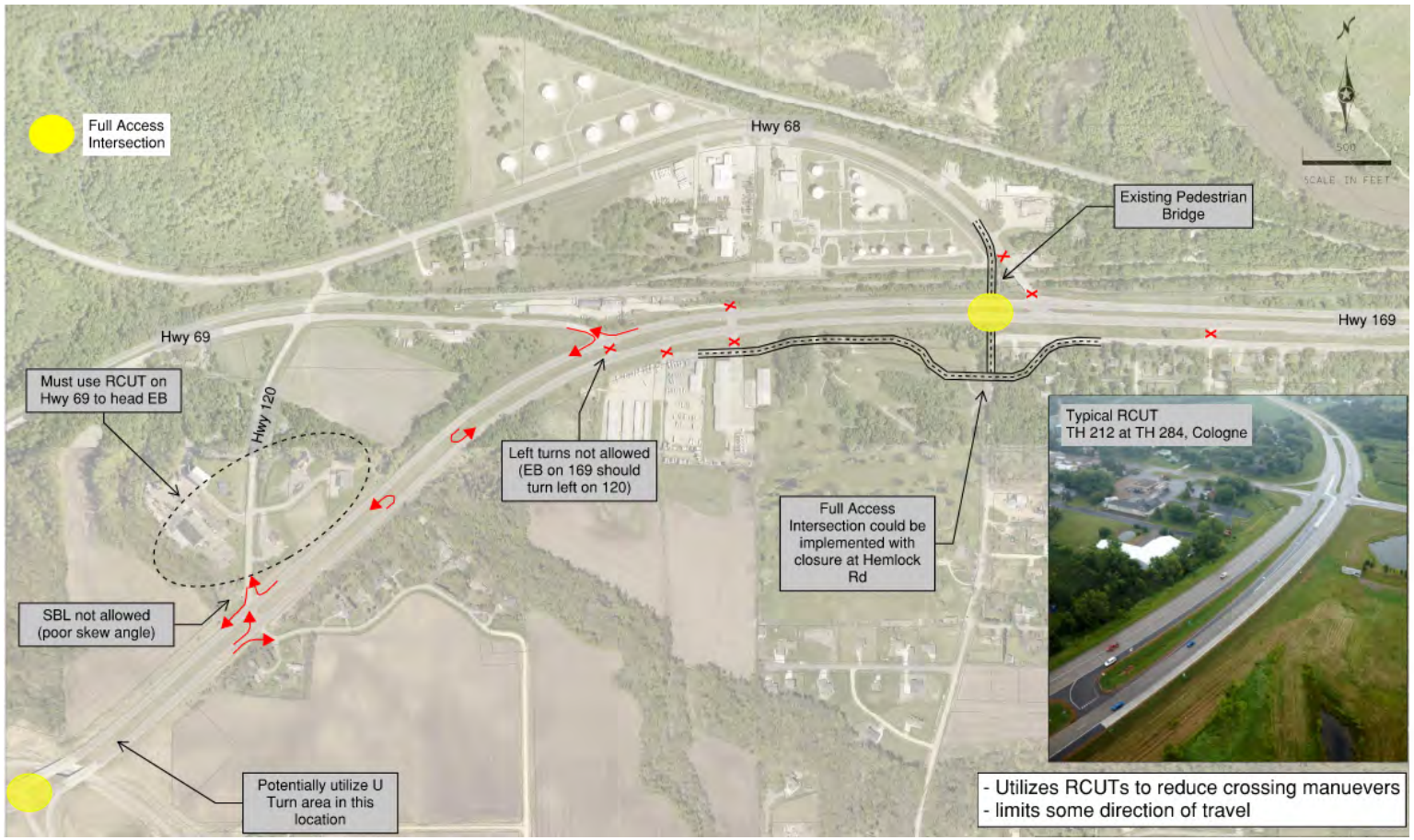
Southern Subarea Concepts

Section 2: Concept 2B2 (Opportunity/Development/Safety Driven)



Southern Subarea Concepts

Section 2: Concept 2C



CONCEPT EVALUATION

	GOOD (++)	FAIR (+)	POOR (-)
Project Goals			Overall Score
Community connections & economic vitality		+	
Mobility for all users		++	
Safety for all users		++	
Community & environmental impacts		+	
Fiscally responsible - $9M		+	
Agency support		++	

SCORE 126

Summary of Evaluation:

Goal A: RCUTs would increase travel time and result in consolidated truck access to existing industrial areas.

Goal B: Does not meet access spacing guidelines. Pedestrian crossing demand is accommodated in Section 1.

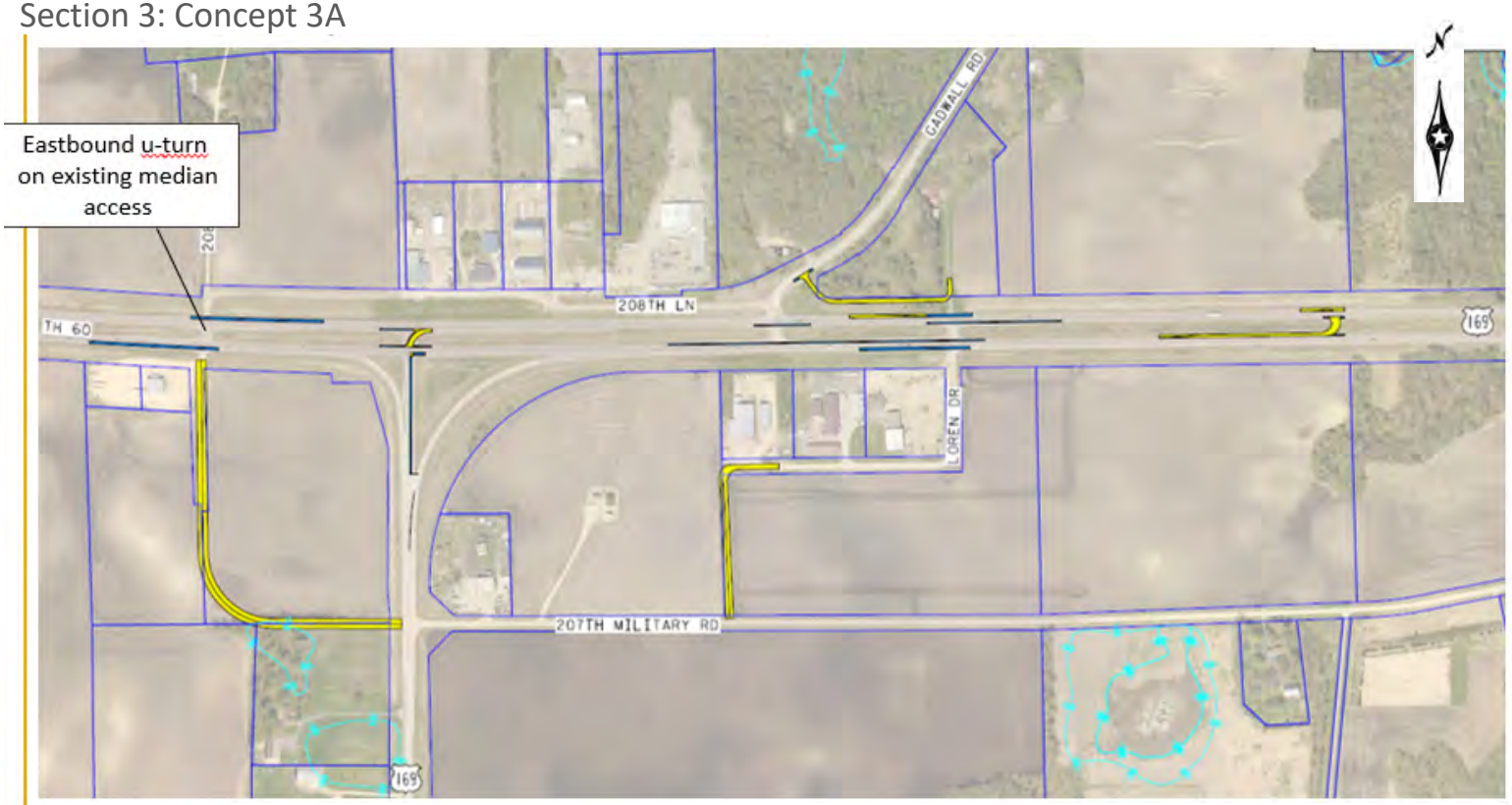
Goal C: RI/RO and reduction in access increases safety.

Goal D: Higher risk impact due to 3 total takes and 4 partial takes needed.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Southern Subarea Concepts

Section 3: Concept 3A



CONCEPT EVALUATION

GOOD FAIR POOR

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	+
Fiscally responsible - $1.9M	++
Agency support	++

SCORE 157.5

Summary of Evaluation:

Goal A: Good local access.

Goal B: Improves access spacing over existing conditions. Pedestrian access not a consideration in this section due to rural character.

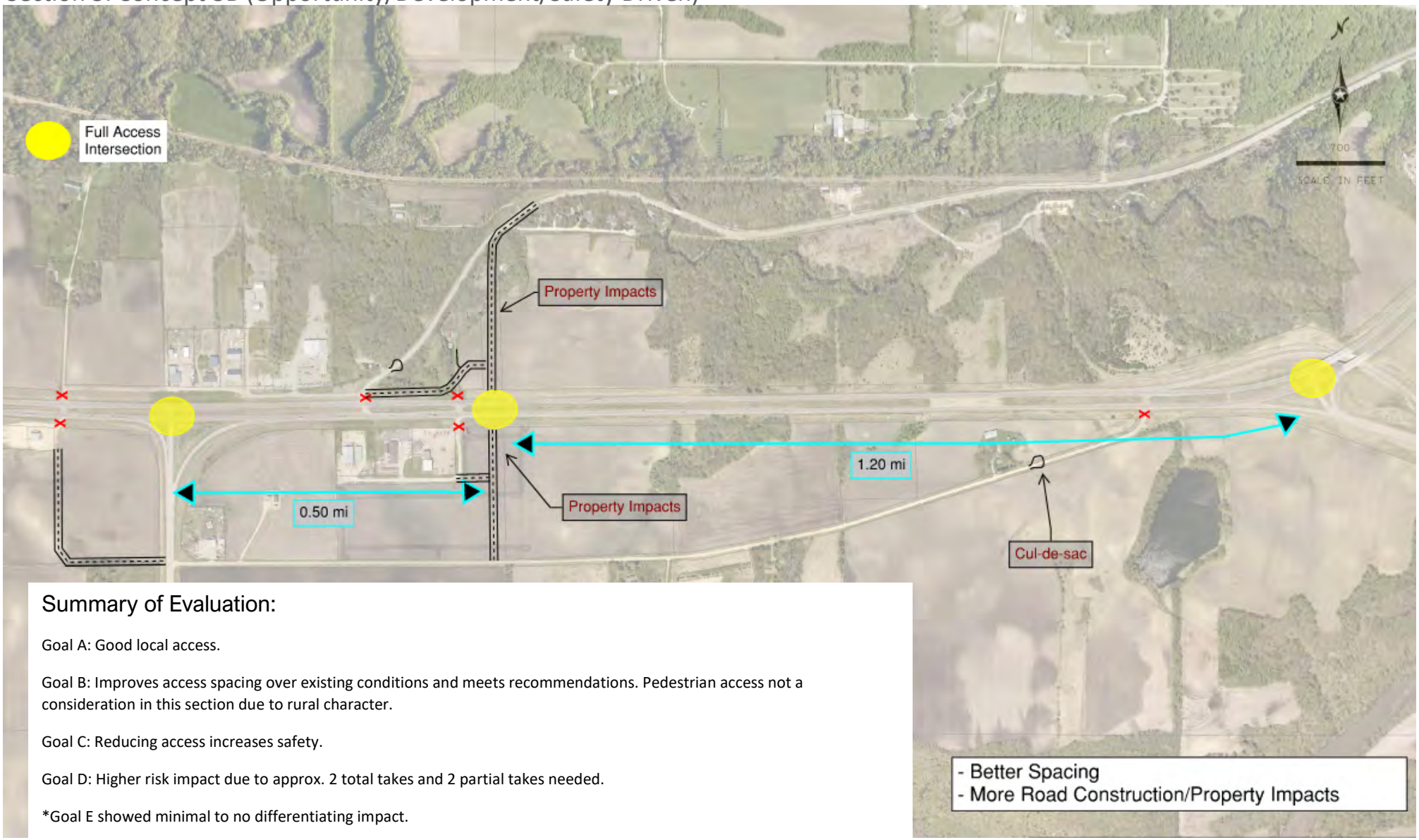
Goal C: Reducing access increases safety.

Goal D: Medium risk impact due to approx. 5 partial takes throughout the area.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Southern Subarea Concepts

Section 3: Concept 3B (Opportunity/Development/Safety Driven)



Summary of Evaluation:

Goal A: Good local access.

Goal B: Improves access spacing over existing conditions and meets recommendations. Pedestrian access not a consideration in this section due to rural character.

Goal C: Reducing access increases safety.

Goal D: Higher risk impact due to approx. 2 total takes and 2 partial takes needed.

*Goal E showed minimal to no differentiating impact.

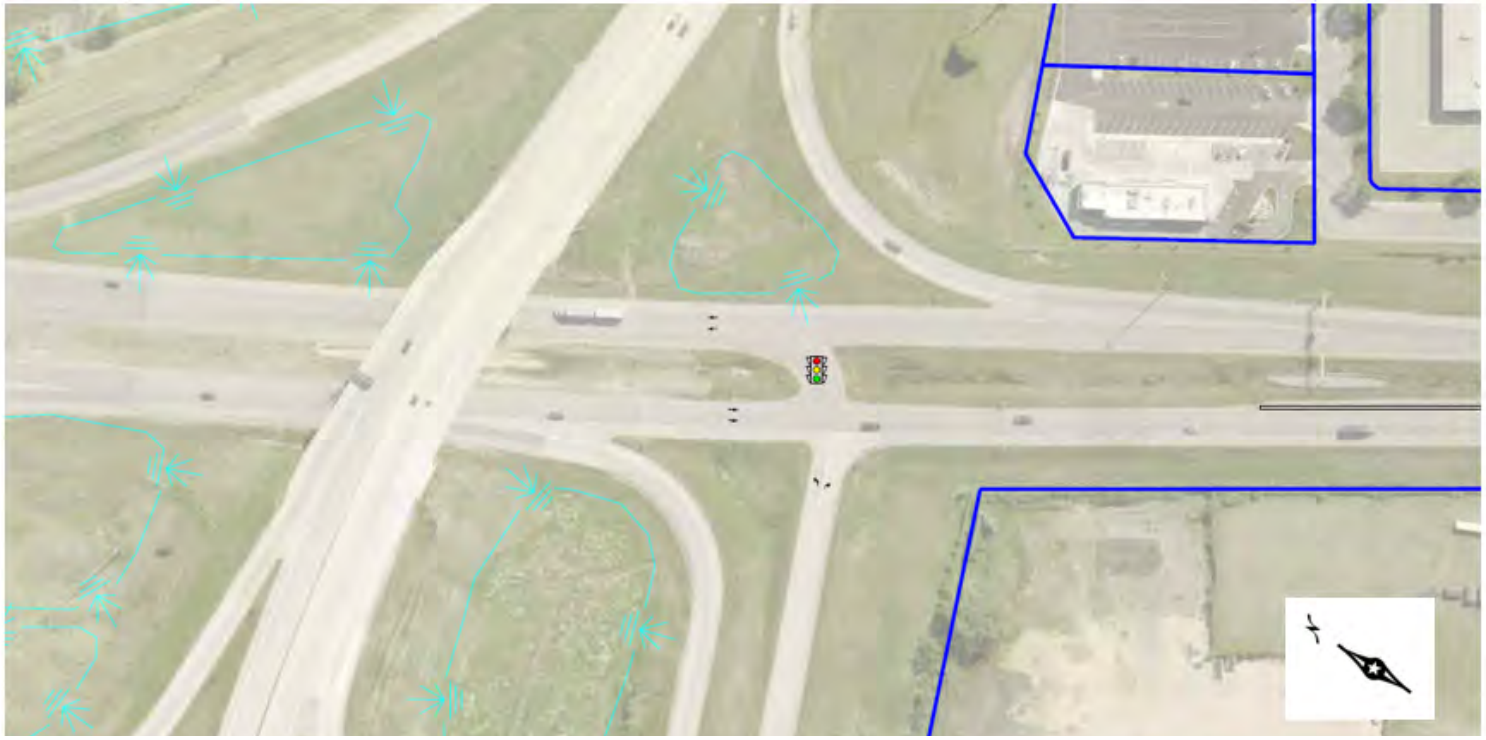
XVI. Concept Updates

The following concept updates were made based on feedback at and following the July 2021 focus group meetings and public open house.

Northern Subarea

Concept 2C – Highway 14/169 Interchange (Eastbound Ramp Signal)

After further evaluation, Concept 2C was updated since a crash issue does not currently exist at the loop ramps. This update retains the southbound to eastbound loop ramp which keeps this a free-flowing movement and reduces the number of phases needed at the signalized intersection.



Summary of Evaluation:

Goal B: Average side street delay is significantly reduced from the no build scenario.

Goal C: Increase in total number of crashes anticipated with adding traffic signal.

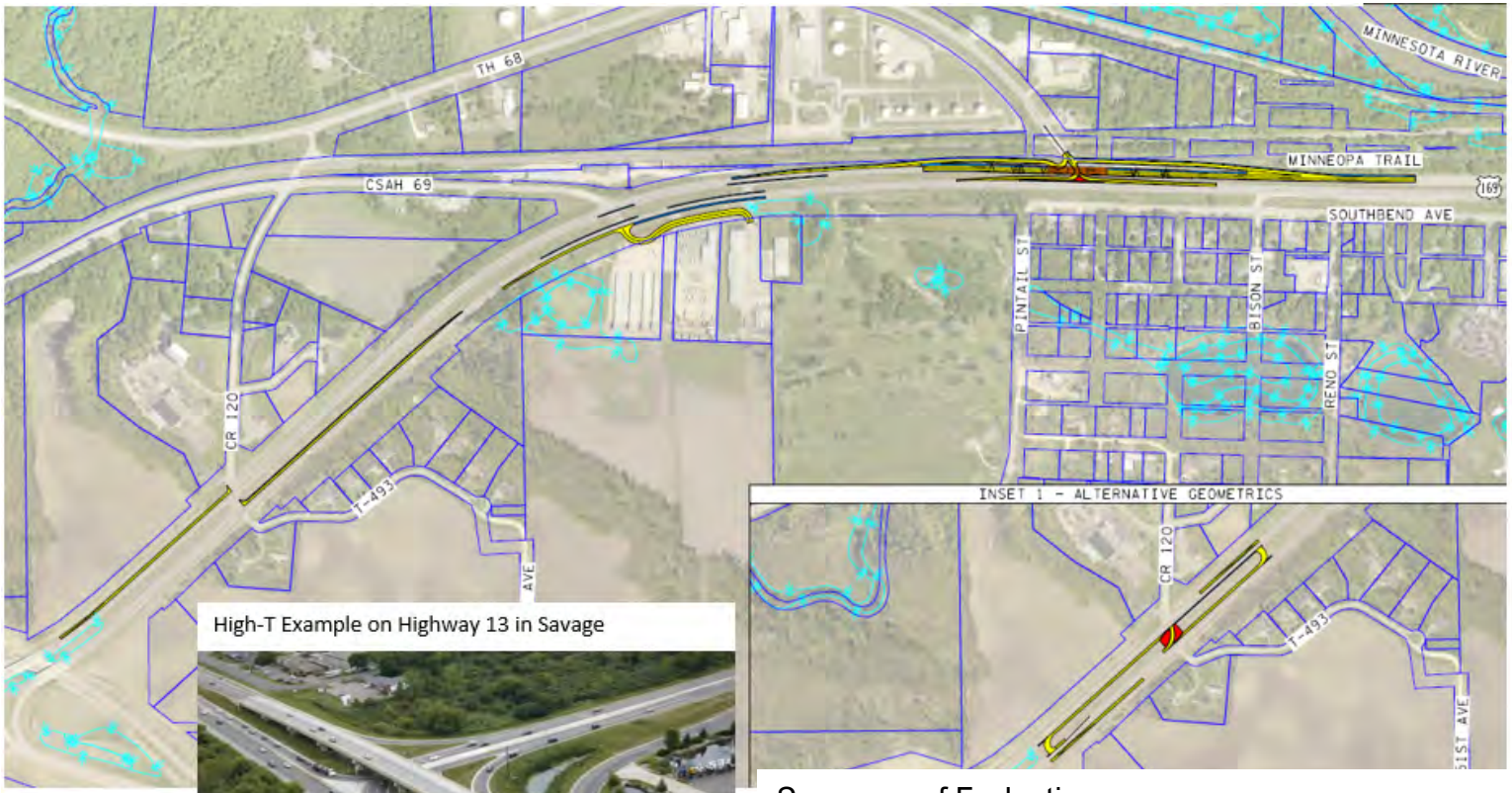
Goal D: Alone poses low risk and further evaluation needed relative to what it is paired with for improvements to the south.

*Goal A and E showed minimal to no differentiating impact.

Southern Subarea

Concept 2A

This concept update addresses concerns the project team heard from Benco Electric Cooperative and Downs Food Group, both located in the northeast quadrant of the County Road 120 and Highway 169 intersection, at the June 2021 focus group meetings. The Benco owner shared their large trucks often struggle with movements on and off Highway 169 related to acceleration and deceleration necessary for merging into high-speed highway traffic. The Benco owner also shared that acceleration and deacceleration areas would also help with safety concerns of all their employees traveling to and from work around the same time.



High-T Example on Highway 13 in Savage

CONCEPT EVALUATION

	GOOD (++)	FAIR (+)	POOR (-)
Project Goals			Overall Score
Community connections & economic vitality	++		
Mobility for all users	++		
Safety for all users	++		
Community & environmental impacts	++		
Fiscally responsible- 22.2M		+	
Agency support	++		

SCORE 154.5

Summary of Evaluation:

Goal A: Provides good local access.

Goal B: Does not meet access spacing guidelines. Pedestrian crossing demand is accommodated in Section 1.

Goal C: High-T and reduction in access increases safety.

Goal D: Low risk impact due to 1 partial take needed south of CR 69.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

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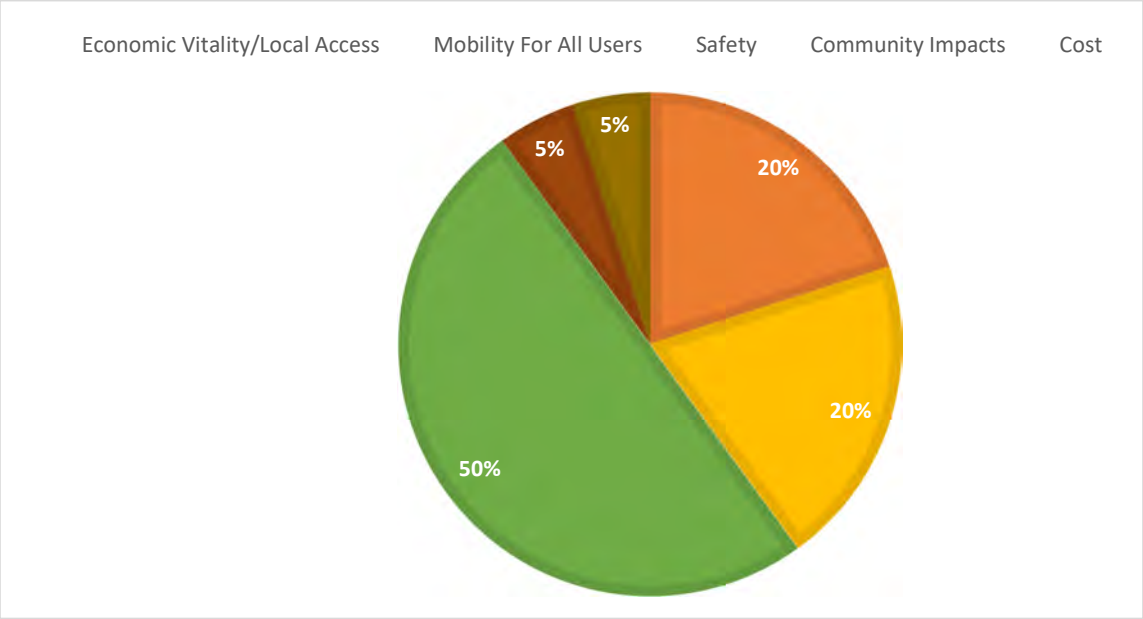
XVII. Final Concept Scoring

A score was determined for each concept to measure its overall benefit and how it compared to others. Each goal was broken down into objectives. The objectives vary by subarea and are shown in **Attachment D**. As shown on the matrices, concepts that did not meet the objective or presented a high risk was given -6 points, a minimally met objective or medium risk was given 3 points and met objective or low risk was given 9 points. The PMT then weighted the importance of each goal. Based on the goal weights shown in **Figure 13**, concept scoring relative to each goal was multiplied by its assigned weight.

Figure 13. Study Goal Weighting Breakdown



Based on the scores received for each concept, the study team conducted a planning-level Benefit Cost Analysis and graphed the results for the Northern and Southern Subareas. The Benefit Cost Analysis assumed infrastructure costs in 2022 dollars. The planning level costs including 20% contingency and 20% for design and construction engineering fees. Full property acquisitions were included in the right-of-way cost at three times the property tax value.

It should be noted for the freeway design (Concepts 1d and 2a), the full cost of these projects is likely underrepresented. The total right-of-way and relocation costs are difficult to predict at a planning-level without detailed designs. As noted above, only full property acquisitions are currently included in the cost calculation. Relocation costs are not included. In addition, both cities have identified additional potential costs due to business closures and reductions in tax base. These costs are also not factored in at this point. Because of these additional influences, it should be anticipated that the total project cost for the freeway concepts will go up and the Benefit/Cost Ratios for each will be reduced.

See **Figures 14-18** on the following pages.

Figure 14. Northern Subarea Expressway Benefit Cost Analysis

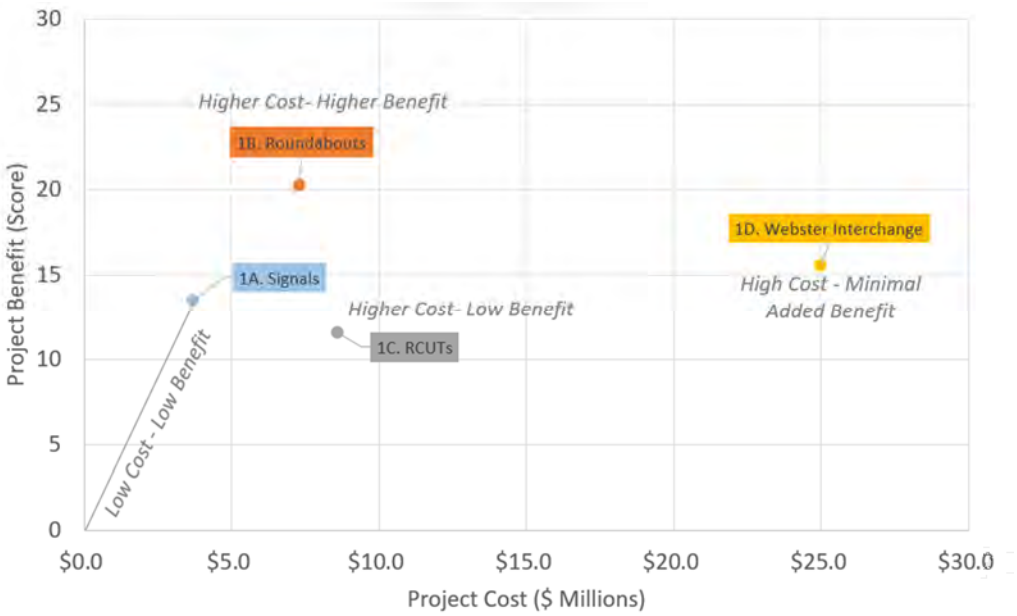


Figure 14 shows the benefit cost analysis for the concepts at Lind Street, River Lane and Webster Avenue in the Northern Subarea. This indicates that Concept 1B (Roundabouts) offers a high benefit, but at a higher cost than the Concept 1A (Signals). Concept 1A (Signals) and Concept 1C (RCUTs) have lower costs, but also offer a lower overall benefit. Concept 1D (Webster Interchange) has a much higher cost and minimal added benefit compared to Concepts 1A and 1C.

Figure 15. Northern Subarea (Highway 14 Interchange) Benefit Cost Analysis

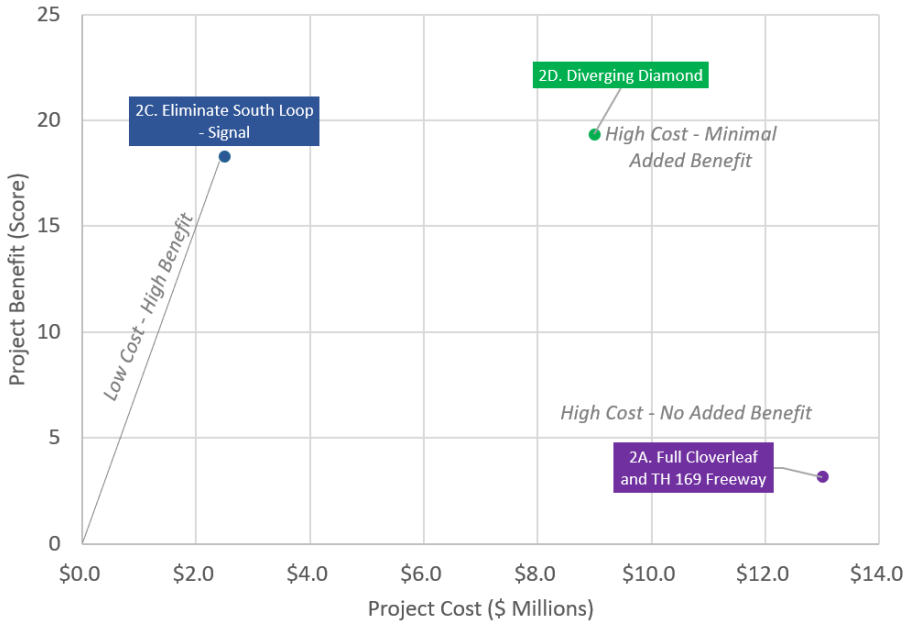


Figure 15 shows the benefit cost analysis for the Highway 14 interchange concepts in the Northern Subarea. This shows that Concept 2C (Eliminate South Loop - Signal) provides the best

cost to benefit ratio. This concept has a high benefit at a low cost. Concept 2D (Diverging Diamond) has a higher cost but offers minimal additional benefit. Concept 2A (Full Cloverleaf and Highway 169 Freeway) has a much higher cost but offers minimal benefit.

Figure 16. Southern Subarea – Section 1 Benefit Cost Analysis

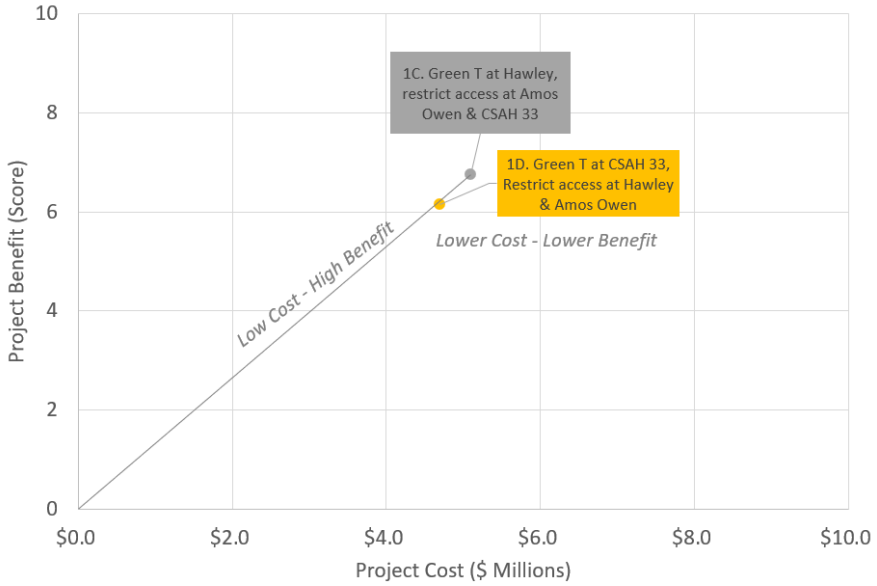


Figure 16 shows the benefit cost analysis for the Section 1 concepts in the Southern Subarea. This shows that Concept 1C (Green T at Hawley Street) provides the best cost to benefit ratio. This concept has the highest benefit at a lower cost. Concept 1D (Green T at CR 33) has a lower cost, but also offers a lower overall benefit.

Figure 17. Southern Subarea – Section 2 Benefit Cost Analysis

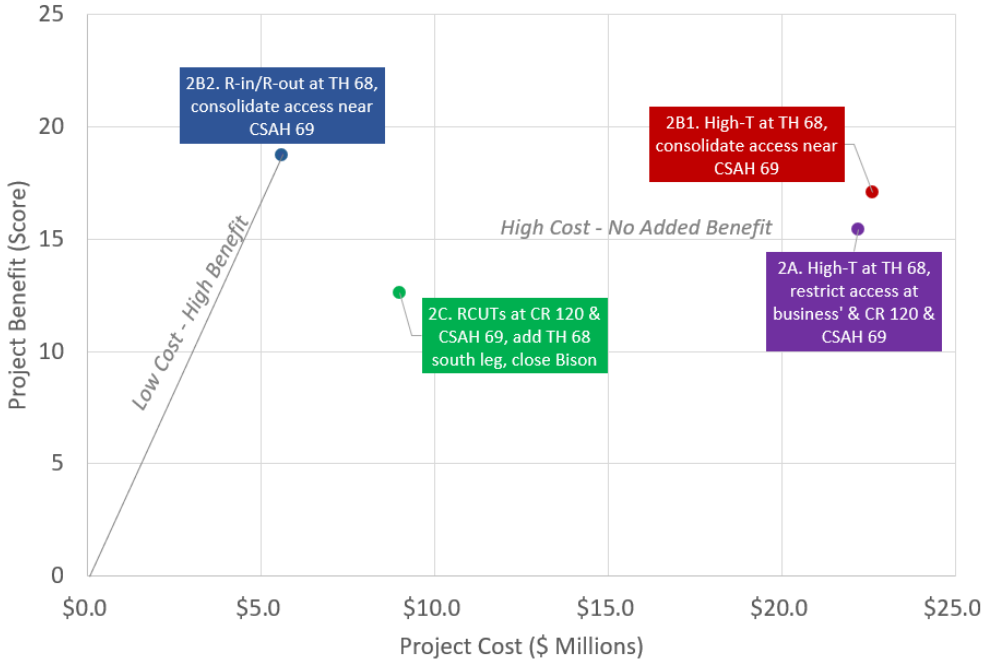


Figure 17 shows the benefit cost analysis for the Section 2 concepts in the Southern Subarea. This shows that Concept 2B2 provides the best cost to benefit ratio. This concept has the highest benefit and the lowest cost. Concepts 2A, 2B1, and 2C all have higher costs and offer a lower benefit.

Figure 18. Southern Subarea – Section 3 Benefit Cost Analysis

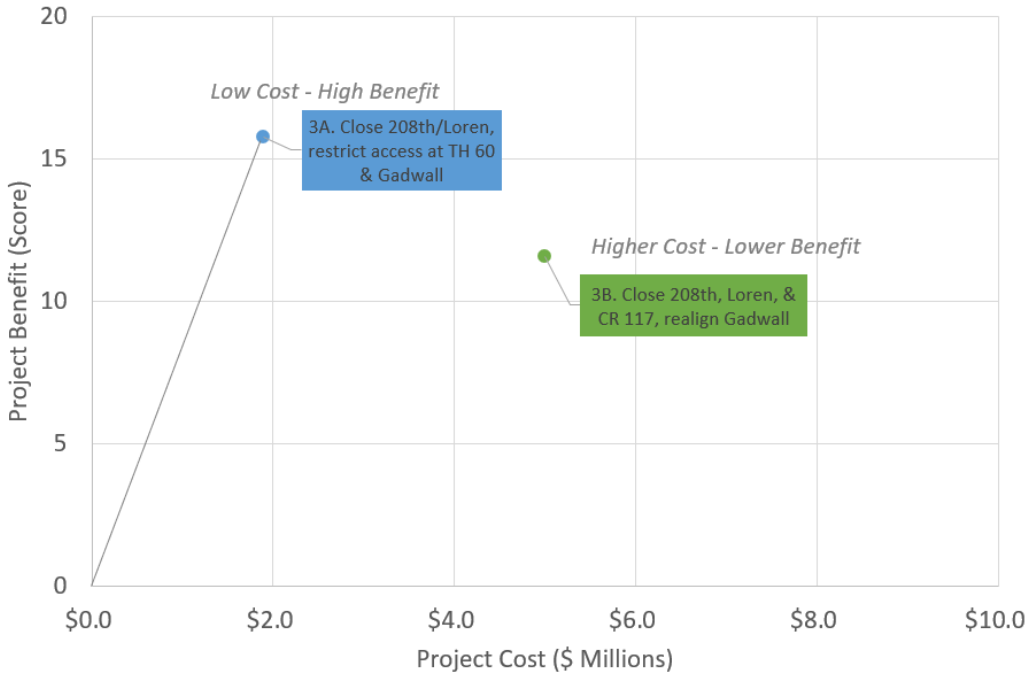


Figure 18 shows the benefit cost analysis for the Section 3 concepts in the Southern Subarea. The figure indicates that Concept 3A is the concept with the optimal cost to benefit ratio. This concept has the highest benefit at the lowest cost. Concept 3B has a higher cost and offers a lower benefit.

XVIII. Detailed Benefit Cost Analysis

A detailed benefit cost analysis was completed for the Northern Subarea concepts. The results of the benefit cost analysis are summarized below. For more information see the full documentation of the benefit cost analysis process in **Attachment D**. Safety and delay benefits were analyzed over a 20-year project lifespan and compared to the overall project cost to determine which concepts are anticipated to have a greater benefit than cost and which have benefits that do not offset the cost. The results of the benefit cost analysis are summarized in **Table 14** for the Lind/River/Webster concepts and **Table 15** for the TH 14 Concepts. The total cost listed includes right of way acquisition for full take properties. Only concepts 1d and 2a were assumed to have full property takes based on the planning level concepts. The cost of acquiring the properties was assumed to be three times the current market value of the property. For concept 1d, six of the properties adjacent to the existing Highway 169 and Webster Ave intersection were assumed to be acquired. For concept 2a, only one property was assumed to be acquired.

Table 14. Benefit-Cost for Lind/River/Webster Concepts

Concepts	Safety Benefit	Delay Benefit	Total Cost	B/C Ratio
Concept 1a. Signalized Expressway	$ -	$(9,762,231)	$3,700,000	**-2.64**
Concept 1b. Roundabout Expressway	$386,419	$19,284,962	$7,300,000	**2.69**
Concept 1c. RCUT Expressway	$7,798,000	$ (16,013,057)	$8,600,000	**-0.96**
Concept 1d. Interchange at Webster	$14,711,915	$74,206,498	$29,431,000	**3.02**

Table 14 indicates that concepts 1b and 1d both have anticipated benefits that are higher than project costs. Since concepts 1a and 1c have benefit cost ratios less than one, the anticipated benefits do not offset the cost. Delay benefits for the concepts 1a and 1c were found to be negative as delay is increased overall with these options.

Table 15. Benefit-Cost for TH 14 Concepts

Concepts	Safety Benefit	Delay Benefit	Total Cost	B/C Ratio
Concept 2a. Full Cloverleaf Interchange (lower end)	$2,458,951	$91,765,194	$17,079,000	**5.52**
Concept 2a. Full Cloverleaf Interchange (higher end)	$2,458,951	$91,765,194	$26,079,000	**3.61**
Concept 2c. Eliminate South Loop - Signal	$(11,782,418)	$52,640,901	$2,500,000	**16.34**
Concept 2d. Diverging Diamond	$(3,886,305)	$49,628,565	$9,000,000	**5.08**
Concept 2f. Signalize EB TH 14 Exit Ramp	$(1,279,631)	$82,151,540	$500,000	**161.74**

Table 15 indicates that all of the TH 14 concepts have anticipated benefits that are higher than the project costs. Safety benefits for the concepts 2c, 2d, and 2f were found to be negative as crashes are anticipated to increase with these options. Concept 2f shows the highest benefit cost ratio as this concept offers a significant delay benefit at a low cost.

It should be noted for the freeway design (Concepts 1d and 2a), the full cost of these projects is likely underrepresented. The total right-of-way and relocation costs are difficult to predict at a planning-level without detailed designs. As noted above, only full property acquisitions are currently included in the cost calculation. Relocation costs are not included. In addition, both cities have identified additional potential costs due to business closures and reductions in tax base. These costs are also not factored in at this point. Because of these additional influences, it should be anticipated that the total project cost for these concepts will go up and the Benefit/Cost Ratios for each will be reduced.

XIX. Locally Recommended Vision and Implementation Plan

The term “locally recommended vision” is used to represent the ultimate vision recommended and supported by the full PMT – Mankato, North Mankato, Blue Earth County, Nicollet County, and MnDOT District 7. Additional design, study, and public discussion will be needed to move the components of the locally recommended vision forward into detailed design and environmental review. At that time, a preferred alternative for each improvement area will be identified consistent with the requirements and process of the National Environmental Policy Act (NEPA) and/or Minnesota Environmental Policy Act (MEPA).

The locally recommended corridor vision was developed by the PMT and reviewed and modified

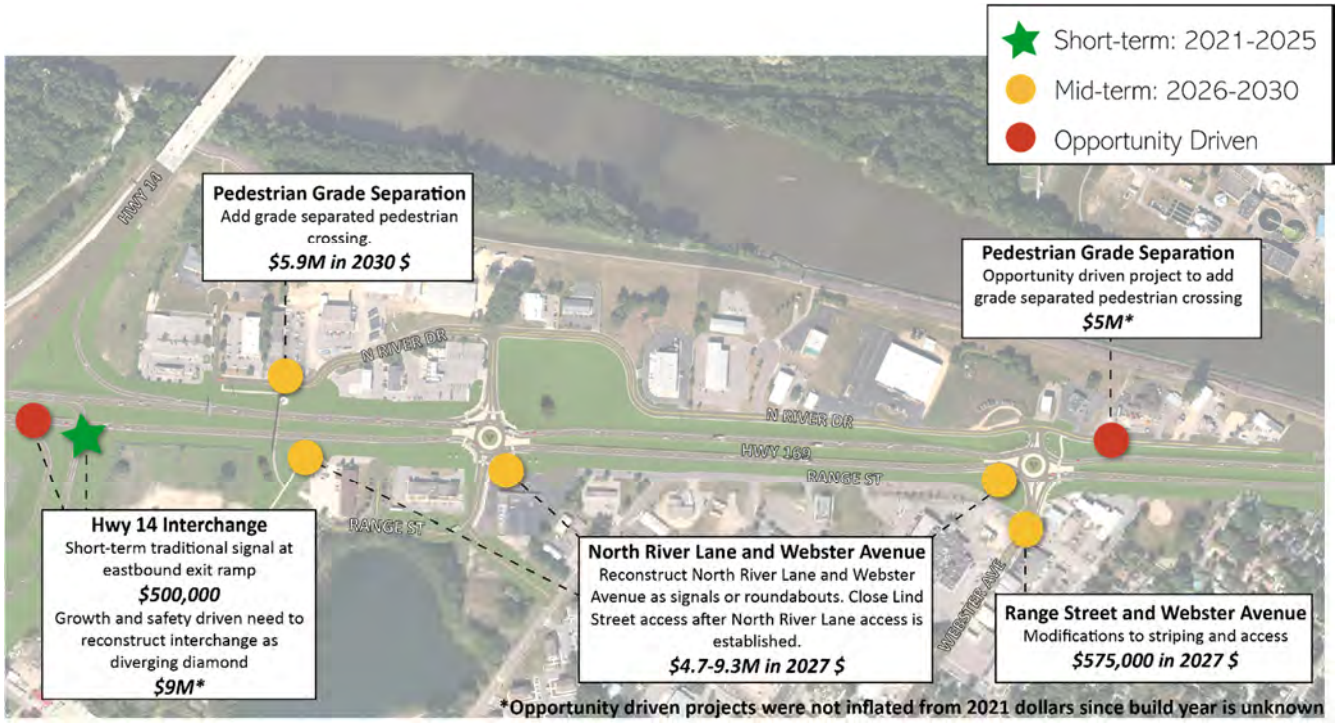
based on public input. An implementation plan was also developed to prioritize standalone projects to be strategically and incrementally implemented over the next fifteen or more years. Timing of projects was organized into short-term (0-5 years), mid-term (6-15 years), or projects that are opportunity driven or only necessary with increased development or rise in safety issues. The mid-term projects are meant to align with MnDOT's planned investments for 2027, particularly in the Northern Subarea. The overall implementation timeframes also coincide with the MAPO Long-Range Transportation Plan (LRTP) implementation timeframes for short-term (2021-2025) and Mid-Term 1 (2026-2030). The Highway 169 Corridor Study implementation plan does not have any projects that would align with the LRTP's Mid-Term 2 (2031-2035) or Long-Term (2036-2045). All remaining Highway 169 recommendations are shown in the Opportunity/Development/Safety Driven implementation category.

The locally recommended corridor vision and implementation timeframes are described below by subarea. The full implementation plan is depicted in tables for the Northern and Southern Subareas in **Attachment F.** Resolutions of support from agency partners are included in **Attachment G.**

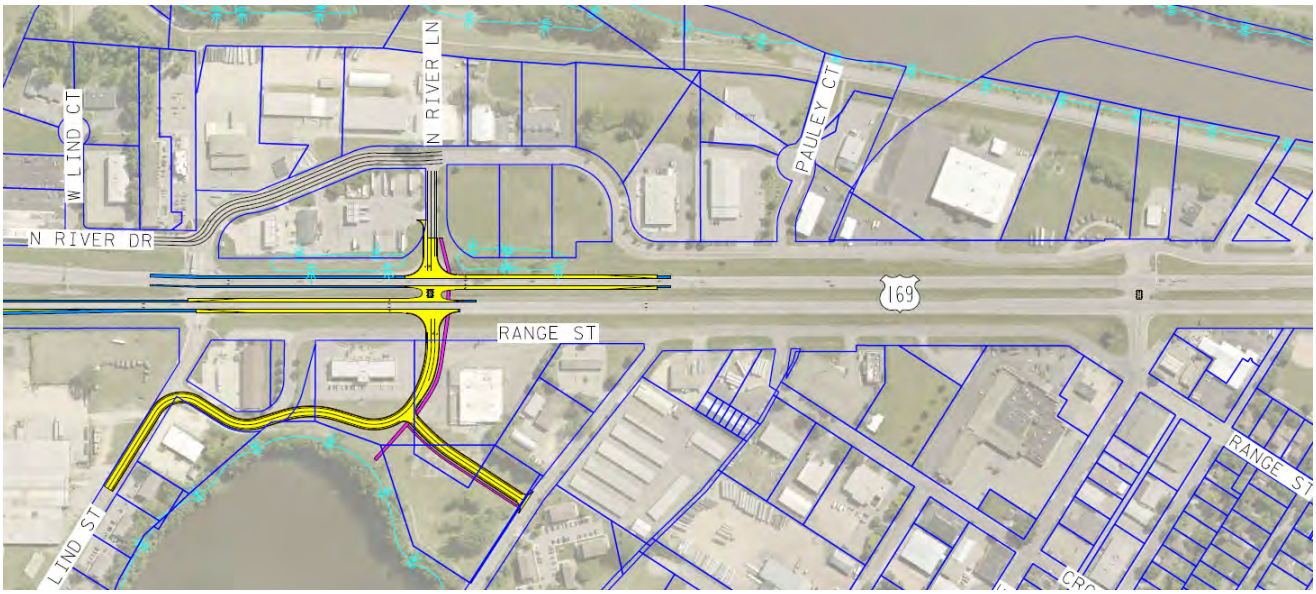
Northern Subarea

The locally recommended corridor vision for the Northern subarea is to remain an at-grade expressway facility with improvements at the Highway 169/14 interchange, North River Lane, and Webster Avenue as described below by timeframe and illustrated in **Figure 19.**

Figure 19. Northern Subarea – Locally Recommended Vision and Implementation Plan



Roundabouts at North River Lane and Webster Avenue, as shown above, are recommended as a priority by the PMT; however, traffic signals at both intersections, as shown below, will also operate acceptably and could be considered for implementation if desired by agency partners.



- **Short-Term (2021-2025)** – Add a traffic signal at the eastbound Highway 14 exit ramp intersection with southbound Highway 169.
- **Mid-Term (2026-2030)** –
  - **North River Lane and Webster Avenue** – Close Lind Street access to Highway 169 and relocate to North River Lane as a full access intersection. The closure of Lind Street should not occur prior to the relocation of North River Lane as a full access intersection. These improvements shall occur concurrently to maintain business access to this area. Roundabouts at North River Lane and Webster Avenue are recommended as a priority by the PMT; however, traffic signals at both intersections will also operate acceptably and could be considered for implementation if desired by agency partners.
  - **Local Road improvements** - Closure of Lind Street and the new full access intersection at North River Lane will require a new local connection on the east side of Hiniker Pond from Lind Street to Butterworth Street and connecting to the North River Lane intersection with Highway 169.

    The recommended vision for Range Street at Webster Avenue is to remain open as a full access intersection with modifications to lane striping on each roadway at this intersection. The closure of the Webster Avenue access to Speedway is also recommended due to its proximity to the Highway 169/Webster Avenue intersection. The Speedway site allows for circulation for a two-way access point off Range Street.
  - **Grade Separated Pedestrian Crossing of Highway 169** – Construct a grade-separated pedestrian crossing of Highway 169 north of the current Lind Street intersection. This

would provide a connection for local pedestrian/bicycle access across the highway and a recreational trip connection between the Bluff Valley Trail and the Rex Macbeth River Trail. A feasibility study will be required to determine the ultimate design (i.e., overpass or underpass) for the pedestrian grade separation.

A video animation was created and shared with the public to illustrate the short-term and mid-term improvements for the northern subarea. The roundabout improvements at North River Lane and Webster Avenue and a pedestrian overpass were represented in the video animation for illustration purposes. https://youtu.be/xDqiNdFOGss

- **Opportunity/Development/Safety Driven** –
  - A Highway 169/14 diverging diamond interchange design was recommended to be retained as an opportunity/development/safety driven project. This design could be considered if operations and/or safety needs dictate in the future. The diverging diamond design could be paired with either signals or roundabouts at North River Lane and Webster Avenue.
  - The City of North Mankato requested to retain the potential for a second grade-separated pedestrian crossing in the Northern Subarea, near Webster Avenue. The need for this additional grade separation would need to be considered in context of a Lind Street pedestrian grade-separation and the 2025 Veterans Memorial Bridge improvements to determine if pedestrian needs across Highway 169 are being adequately met by two grade separations (Lind Street and Veterans Memorial Bridge) or if another crossing would be beneficial.

Freeway Concept

The detailed benefit cost analysis for the Northern Subarea determined that a freeway (full cloverleaf Concept 2D) is not needed for operations projected out to 2040. The signalized exit ramp (Concept 2f) showed comparable delay benefits at significantly less cost. The roundabout express way (Concept 1B) showed comparable benefits with significantly less cost to the Webster Avenue interchange (Concept 1D) out to 2040. The roundabout express way (Concept 1B) is also a concept supported by local agencies and the public including the freight generating businesses that participated in this study's open houses and the Webster Avenue Area Plan.

In summary, the freeway concepts are not included in the vision and implementation plan because of the lower-cost/high-benefit alternate solutions that are recommended.

Middle Subarea

All five concepts, shown in **Figures 20-24**, in the middle subarea were recommended to be carried forward for further consideration in the future. MnDOT and the cities of Mankato and North Mankato will use these concepts as a starting point to engage in further analysis and public input to identify a preferred alternative with future programmed projects. At the writing of this report, MnDOT was actively working with both cities to scope improvements to the Veterans Memorial Bridge, including pedestrian improvements and potential ramp intersection roundabouts.

The City of Mankato and MnDOT should update the operational and safety analysis for Riverfront Drive/Highway 169 interchange improvements as a project becomes more imminent.

There were several variables at play during the Highway 169 Corridor Study that may change the results of the analysis and the level of investment needed at this location. These variables included impacts on traffic volumes and patterns due to COVID, shifts in West High School start times, and uncertainty in the future of West High School in its current location. At the writing of this report, the school had initiated a community survey to determine interest in a referendum for major improvements at the school in its current location and/or a new location. The high school is a major generator of traffic at this interchange location and as such, current data on operations and safety and the time of improvements will be important.

Near the end of the corridor study in October 2021, the City of Mankato staff completed traffic counts at the Riverfront Dr/Hwy 169 ramps for comparison to previous counts at this location. A full operational analysis was not repeated at this time but the comparison was used to identify differences and/or trends from previous counts at this location during the Riverfront Drive Corridor Study (2016) and those developed for the Hwy 169 Corridor Study (2020). Here is a summary of the observations:

a. No reduction in southbound left volume at the southbound Highway 169 ramp during the AM peak hour, rather a 15-18% increase in traffic counts compared to the 2016 counts (and 9-11% increase from what was estimated for 2020). The AM peak hour did show issues during both corridor studies. The increase observed in the October 2021 counts validates the concepts from the Highway 169 corridor study as still being applicable.
b. The eastbound through at northbound Highway 169 ramp remains about the same when comparing the 2016 and 2020 counts to the updated 2021 counts.
c. The counts show a decrease in the PM peak hour, however, it was the AM peak hour that showed worse operations.

See **Attachment D** for a summary of the peak hour volumes at each location and percent change for the major movements.

Figure 20. Middle Subarea – Veterans Memorial Bridge Pedestrian Improvements Option

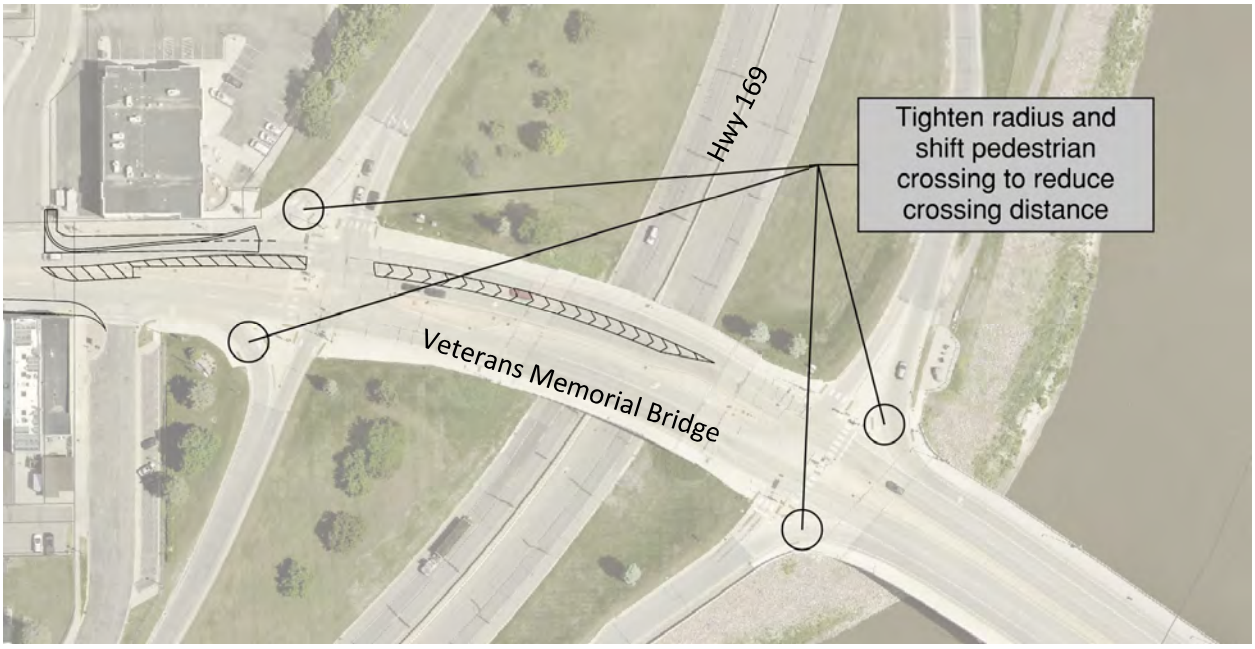


Figure 21. Middle Subarea – Hwy 169 Ramp/Belgrade Roundabout Option

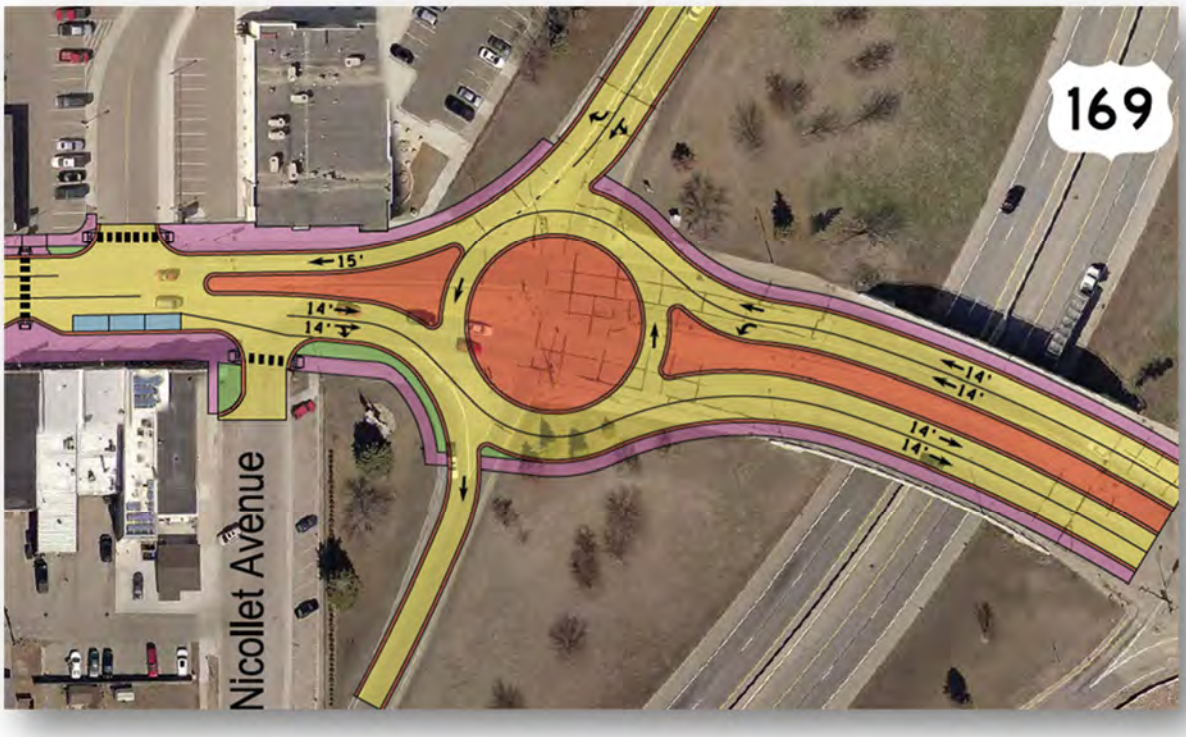


Figure 22. Middle Subarea – Riverfront Drive Turn Lane and Pedestrian Improvements Option

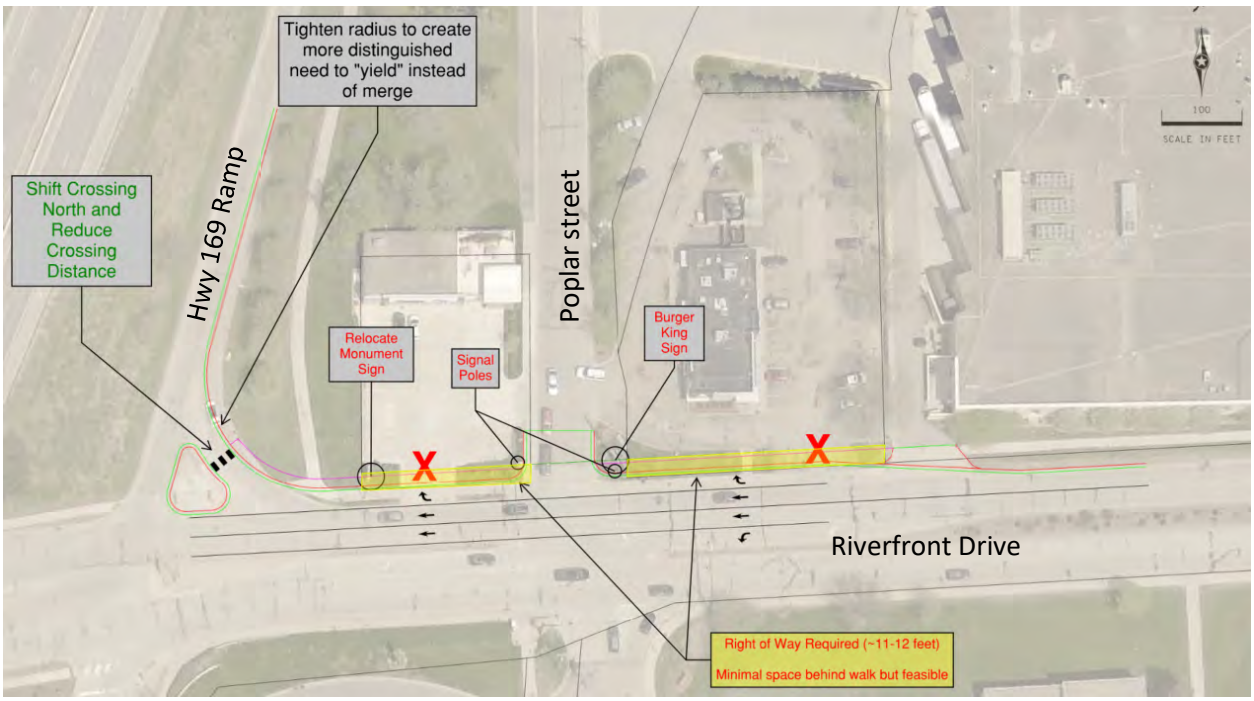


Figure 23. Middle Subarea – Riverfront Drive Triple Left Turn Lane Improvement Option

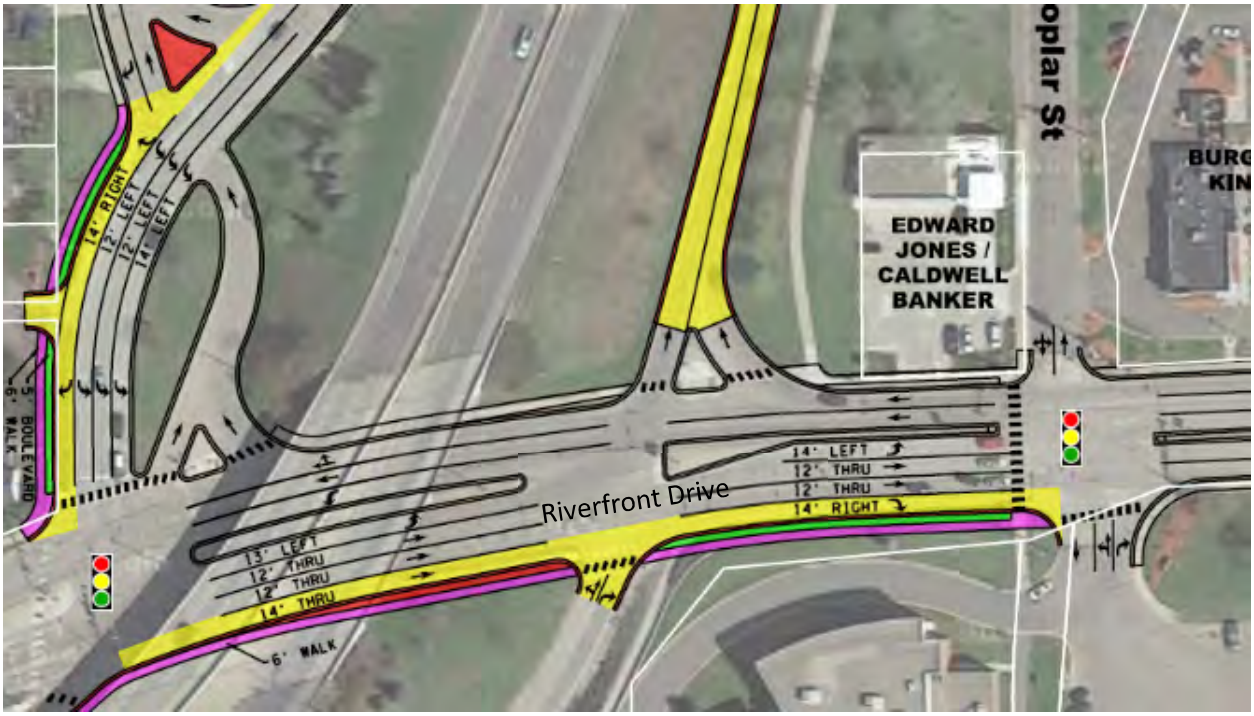
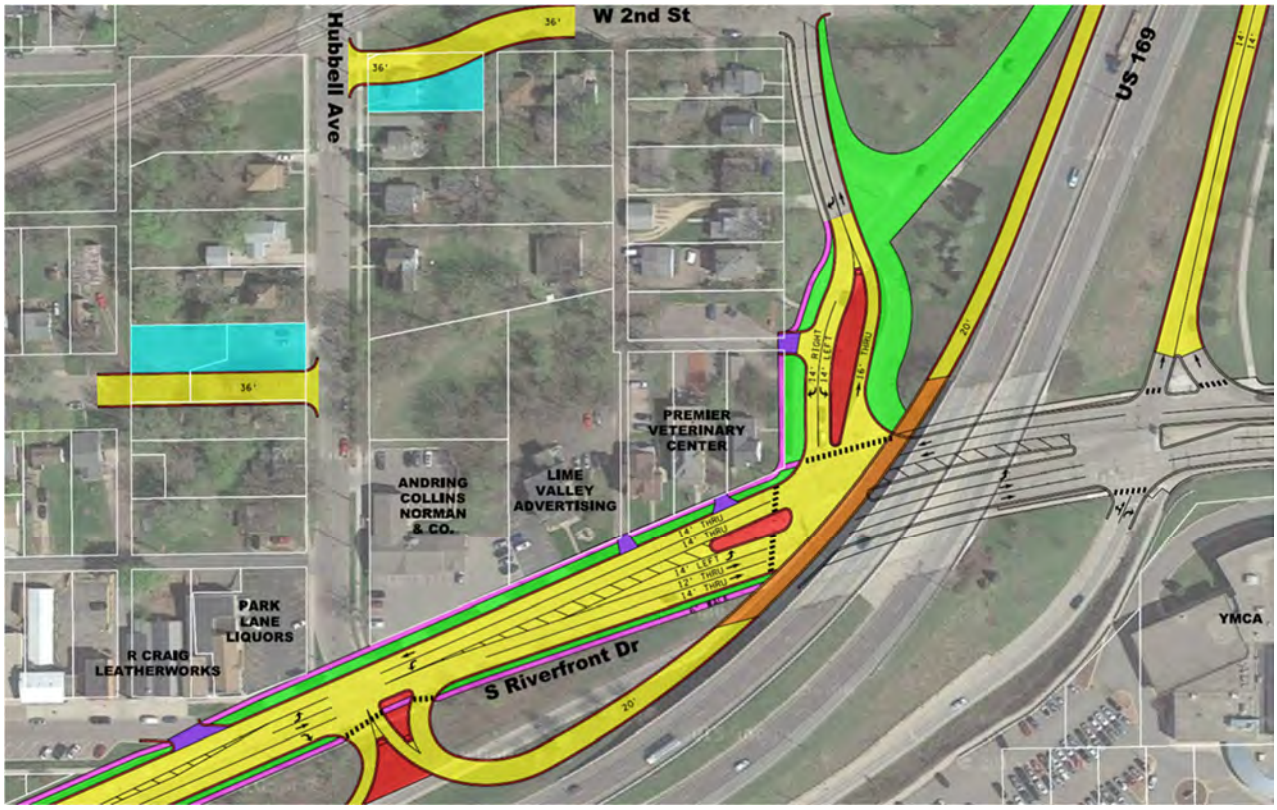


Figure 24. Middle Subarea –Add New Hwy 169 Exit Ramp and Extend Over Riverfront Drive



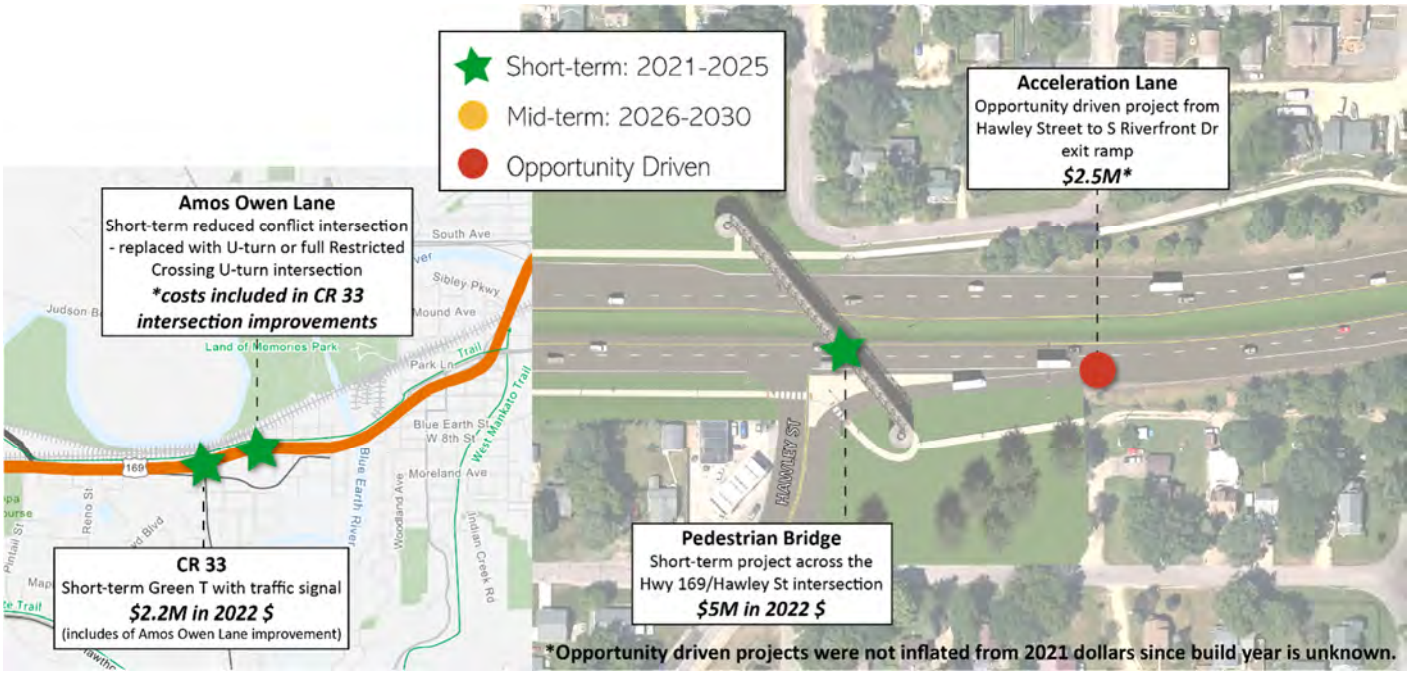
Southern Subarea

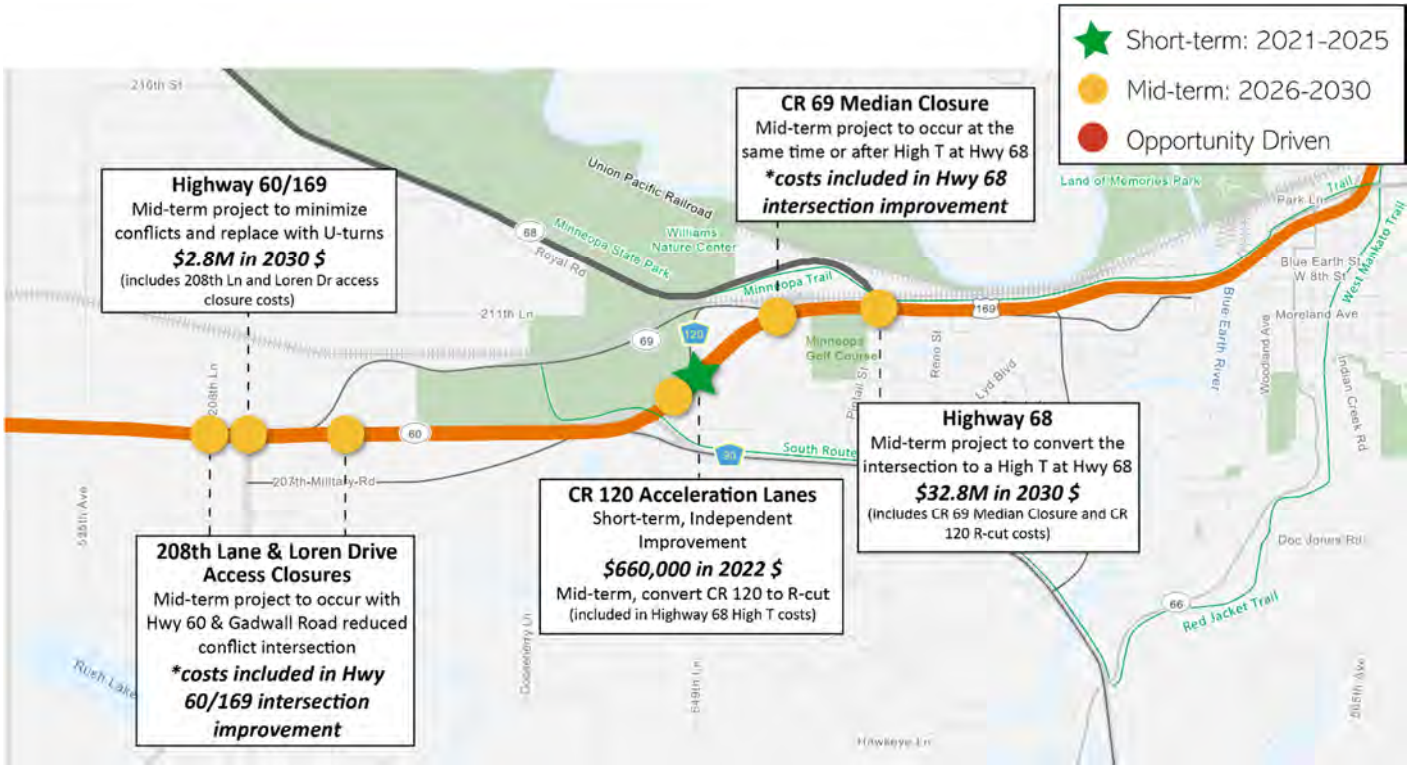
The Southern Subarea is not currently in MnDOT's Capital Highway Investment Plan (CHIP) 2026-2031. Therefore, it will likely be several years before investments are made in this area. Additional design, study, and public input will be needed to confirm the locally recommended corridor vision for this area. The design details and implementation timing will be further discussed by MnDOT and its partners at the time a project is funded and construction becomes more imminent.

Although there is no funding for this subarea currently identified through the year 2031, the PMT did identify a locally recommended corridor vision and implementation sequencing as part of the corridor study should funding become available. Further investigation on access control based on development needs or operational and safety issues may result in changes to the corridor vision based on conditions at time of investment.

The locally recommended corridor vision for the Southern Subarea is for a hybrid (partial at-grade/partial grade separation) expressway facility with improvements at the Highway 60, CR 120, CR 69, Highway 68, CR 33, Amos Owen Lane, and Hawley Street as described below by timeframe and illustrated in **Figure 25:**

Figure 25. Southern Subarea – Locally Recommended Vision and Implementation Plan





*Opportunity driven project costs were not inflated from 2021 dollars since build year is unknown.

- **Short-Term (2021-2025)** –
  - **Pedestrian Grade-Separated Crossing of Highway 169** - Construct a grade-separated pedestrian crossing of Highway 169 at Hawley Street for local and recreational access between neighborhoods, retail business, and recreational parks and trails. A feasibility study will be required to determine the ultimate design (i.e., overpass or underpass) for the pedestrian grade separation.

A video animation was created and shared with the public to illustrate the Hawley Street improvements in the southern subarea. A pedestrian overpass was represented in the video animation for illustration purposes. https://youtu.be/xDqiNdFOGss

  - **CR 33 to Hawley Street** – Two options were retained for further consideration:
    - Unsignalized reduced conflict intersection at Amos Owen Lane with southbound to eastbound left removed and replaced with U-turn to the west of the intersection. Hawley Street would be right-in/right-out.
    - Full unsignalized reduced conflict intersection at Amos Owen Lane with Hawley Street remaining open as it is today.
    - Both options described above would be paired with a Green T traffic signal at CR 33 for eastbound Highway 169 traffic and all left turning traffic at this intersection (northbound to westbound left and westbound to southbound left). Westbound Highway 169 would remain free flow. During the study, MnDOT expressed concern with the addition of a traffic signal at this location due to its rural, high-speed character. MnDOT will revisit this recommendation when a project becomes more imminent to determine if an at-grade Green-T intersection is recommended versus

looking towards partial grade separation improvements that would maintain free-flow conditions on Highway 169.

- **CR 120** – Add acceleration lanes in each direction at this intersection.

- **Mid-Term (2026-2030)** –
  - **CR 120 to Highway 68 –**
    - Construct a partial grade separation called a High-T at Highway 68. This would raise the westbound Highway 169 lanes on structure over the existing Highway 169/Highway 68 intersection, providing free-flow movements for both eastbound and westbound Highway 169. Turning movements to/from the highway would occur at an intersection under the grade separated westbound lanes.
    - Close the CR 69 full access intersection with a median to allow for right-in/right-out movements from both directions. Left turns to/from Highway 169 at this location would be relocated to the Highway 68 High-T intersection. Another viable option, that consolidates CR 69 and CR 120 is discussed below in the list of Opportunity/Development/Safety Driven concepts.
    - Convert the CR 120 intersection to an unsignalized reduced conflict intersection
  - **Highway 60 to CR 90 –**
    - Add a new local road connection to consolidate access between 208th Lane and Loren Drive on both the north and south sides of Highway 169.
    - Unsignalized reduced conflict intersection at Highway 60/169 with left turns replaced with U-turns movements east and west of the intersection.

- **Opportunity/Development/Safety Driven** –

  The following improvement concepts were evaluated but did not have a specific timeframe associated with them. Instead, they were recommended for consideration only if an opportunity arises from development driven needs and/or safety issues arise.

  - Eastbound acceleration lane from Hawley Street to the partial Riverfront Drive interchange. This improvement should be considered at the time the Blue Earth River bridge crossing is evaluated as it would likely require bridge widening.
  - Development driven local roadway network improvements. Concepts 2C and 3B (see **page 72**) propose several local roadway extensions and connection to support potential future development between Highway 60 and Highway 68. At the time of this study, there were no imminent development proposals and/or plans that would warrant additional local roadway improvements. The PMT recommended these concepts be documented for future use if development occurs. Improving the local roadway network would reduce direct access to Highway 169, resulting in improved safety.

XX. Next Steps

Additional design, studies and public input will be needed for each of the recommended improvement concepts to move forward. The purpose of the Highway 169 Corridor Study was to develop a long-term plan for improvements. The concepts developed as part of this study are high-level and will need additional refinement through preliminary and final design. Environmental review and permitting will also be required with exact requirements based on

the scope of the project and the funding source. See **Attachment D** for environmental screening considerations and considerations for concept scores. Also see the Existing Conditions Report for more detail on the study environmental review.

The improvement concepts identified within this study and the projects prioritized as part of the implementation plan will help the Mankato Area Planning Organization (MAPO), MnDOT, and the Cities of Mankato and North Mankato, and Blue Earth and Nicollet Counties to continue to maintain a functioning yet safe principal arterial roadway.

Study engagement reported a recurring desire for corridor aesthetic and beautification improvements. Implementing agencies should continually assess and pursue beautification opportunities, including potential grant solicitation programs and cooperative cost participation scenarios. Cost participation scenarios should consider not only upfront/installation costs, but also additionally consider maintenance and upkeep responsibilities and respective roles of state and local governments.

Study partners must continue to work together to further plan, obtain funding, design, and implement the recommended improvement projects. All partners have an active role in implementing these improvements. All competitive funding sources should be considered. Agencies should also update their comprehensive and transportation plans to include these findings to better leverage funding sources.

Attachment A – Study Parameters City Resolutions

Resolution: City of Mankato

R-19-0708-119

RESOLUTION AUTHORIZING AND REAFFIRMING THE CITY OF MANKATO'S PARTICIPATION TO UNDERTAKE A JOINT CORRIDOR STUDY FOR HIGHWAY 169

WHEREAS, in 1996, a Highway 169 Corridor Plan was developed under the Mankato Area Transportation Study (MATAPS) process; and

WHEREAS, the City of Mankato facilitated certain local road improvements, connections, and aspects of the MATAPS plan; and

WHEREAS, subsequent updates to the MATAPS plan were made in 2003, and again in 2010; and

WHEREAS, the public engagement process identified concerns on the part of Mankato property owners along the corridor that any closure and subsequent relocation of the Lind Street access be done in a manner that assures long-term economic vitality of the businesses and properties serviced by the Lind Street access; and

WHEREAS, the Highway 14 /Highway 169 interchange is inadequate, and in particular, the turning movements from North Mankato TH 14 to the TH 169 ramp are in need of critical safety and operational improvements; and

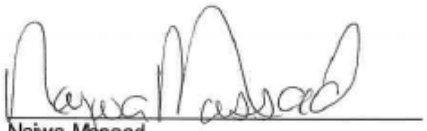
WHEREAS, it is imperative that the corridor plan be prepared and included in the revised 10 year Long Range Transportation Plan for MnDOT District 7, so as to assure effective reinvestment of future state transportation funding and securing federal funding opportunities.

NOW THEREFORE BE IT RESOLVED by the City Council for the City of Mankato that participation is authorized in the Highway 169 Joint Corridor Study provided that any alternatives which include the closure and relocation of Lind Street remain economically viable to the affected businesses and property owners within the City of Mankato.

BE IT FURTHER RESOLVED that the City of Mankato retains its rights of municipal consent over local street closures and access relocations identified through the Highway 169 Corridor Study process.

This Resolution shall become effective upon its passage and without further publication.

Dated this 8th day of July, 2019.



Najwa Massad
Mayor

Renae Kopischke
Executive Assistant

Resolution: City of North Mankato

RESOLUTION NO. 53-19

RESOLUTION AUTHORIZING NORTH MANKATO'S LOCAL CONSENT FOR THE MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION TO UNDERTAKE A CORRIDOR STUDY OF HIGHWAY 169 FROM LAKE STREET NORTHWEST TO STATE HIGHWAY 60 AND ALSO PROVIDING CONDITIONS OF THAT LOCAL CONSENT

WHEREAS, in 1996, area governments decided that an area transportation plan was needed. This resulted in a coordinated effort to produce the Mankato Area Transportation & Planning Study (MATAPS); and

WHEREAS, an update of MATAPS was completed in 2003 and 2012; and

WHEREAS, a reoccurring component of MATAPS was Highway 169 corridor improvements; and

WHEREAS, the Mankato/North Mankato Area Planning Organization Policy Board (MAPO) budgeted funds for the Highway 169 Corridor Study from Lake Street Northwest to State Highway 60 to be completed in 2019; and

WHEREAS, proceeding with corridor studies requires a resolution of consent from local governments included in the study; and

WHEREAS, a critical intersection along the Highway 169 Corridor is at Webster Avenue where many North Mankato businesses rely on unrestricted access and turning movements on and off Highway 169; and

WHEREAS, in 2017, the City of North Mankato held business engagement meetings with area businesses to discuss the importance of the Highway 169 and Webster Avenue intersection; and

WHEREAS, it was evident that all participating area businesses believe that both north and southbound access from Webster Avenue to Highway 169 is critical to the success of their businesses, and do not support any planning efforts which would restrict turning movements on or off of Highway 169 at Webster Avenue; and

WHEREAS, the official position of the City of North Mankato is Webster Avenue shall remain open as a full access intersection with no restriction on turning movements and this has been North Mankato's position for over twenty years; and

WHEREAS, Webster Avenue is a critical full access intersection for both transportation and emergency response in Lower North Mankato; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF NORTH MANKATO, MINNESOTA, AS FOLLOWS:

1. The North Mankato City Council supports the inclusion of a Highway 169 Corridor Study in the 2019 MAPO work plan subject to the following condition:

    a. The study will include maintaining a full access intersection at Webster Avenue that is supported by the City of North Mankato.

2. If the study includes an option for relocating the Webster Avenue intersection, North Mankato's support for the recommendations is conditioned on the following:

    a. All existing businesses in the corridor are provided with an economically viable and safe access.

    b. Any new proposed location of the Webster Avenue intersection must remain within the boundaries (present or expanded) of the City of North Mankato.

    c. Any new proposed location for the Webster Avenue intersection must include an area that is economically viable and feasible for redevelopment and reinvestment.

d. Any new proposed location of the Webster Avenue intersection will include a safe outlet for residents in Lower North Mankato, and that access point must be within the municipal boundaries (present or expanded) of North Mankato.

3. An oversight committee be established for the project, including one staff member from the City of North Mankato, one staff member from the City of Mankato, and one staff member from the Minnesota Department of Transportation. This committee will be responsible for issuing, receiving proposals, interviewing prospective firms, recommending firms for selection to the MPO board, managing the corridor study, and approving its recommendations to the Policy Board and respective jurisdictions.

This resolution shall become effective immediately upon passage and without publication.

Adopted by the City Council this 1st day of July 2019.

Mayor

ATTEST:

City Clerk

Attachment B – Existing & No Build Conditions Memos

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Final Existing Conditions & No-Build Conditions Report

Date: August 8, 2020

To: Charles Androsky, Transportation Planner, MAPO

From: Angie Bersaw, AICP Deputy Project Manager, Bolton & Menk, Inc.

Ashley Hudson, Transportation Planner, Bolton & Menk, Inc.

Subject: Existing and No-Build Conditions

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO)

Project No.: T61120619

BOLTON & MENK
Real People. Real Solutions.

Table of Contents

Appendices

I. Introduction

The Highway 169 Corridor Study was initiated by the Mankato/North Mankato Area Planning Organization (MAPO) and the Minnesota Department of Transportation (MnDOT) District 7 to develop a comprehensive plan for future corridor investments. Portions of the Highway 169 Corridor in the Mankato/North Mankato/Sound Bend Township area have been studied numerous times over the past two decades. The study area is depicted in **Figure 1** (Appendix A). Improvements such as turn lanes, acceleration lanes, pedestrian crossing enhancements, trail connections, and frontage road improvements have resulted, yet a few key concerns remain:

1. Operational and safety concerns from County Road 120 to the Blue Earth River Crossing
2. Pedestrian and bicycle connectivity across Highway 169 throughout the corridor
3. Maintaining access to area businesses
4. Maintaining emergency access
5. Operational and safety concerns between Veterans Memorial Bridge and Lake Street, including the Highway 169/14 interchange
6. Maintaining economically viable access to business and property owners near Lind Street (per City of Mankato Resolution No. R-19-0708-119)
7. Maintaining full access at Webster Avenue; if Webster Avenue is proposed to be relocated, it must:
    a. Provide economically viable and safe access for all existing businesses in the corridor
    b. Remain within the boundaries (present or expanded) of the City of North Mankato
    c. Include an area that is economically viable and feasible for redevelopment and reinvestment
    d. Provide a safe outlet for residents in Lower North Mankato, and that access point must be within the municipal boundaries (present or expanded) of North Mankato (per City of North Mankato Resolution No. 53-19).

Both the City of Mankato and City of North Mankato resolutions noted above, are included in Appendix A and the previous studies section of this report, and as an attachment to the study's Project Management Plan. These resolutions state each city's conditions of consent to participating in the Corridor Study.

The study will seek to understand the needs and opportunities in the corridor; establish purpose and need, and goals and objectives; develop and evaluate alternatives; reach consensus on a vision; and develop an implementation plan that defines improvement triggers and allows the vision to be achieved in increments. Consultant staff will utilize the history of the corridor to bring fresh ideas and innovative approachs to the propsed vision. This process will allow an aligned vision that blends and balances competing interests like mobility, access, and economic needs. The Highway 169 implementation plan will guide future planning and programming of land use/economic development opportunities, bridge improvements, and operational and safety enhancements for all modes of travel.

The purpose of the Highway 169 Corridor Study is to:

- Define an ultimate vision for Highway 169 that is innovative, realistic, and ensures economic vitality and safety, mobility, and access for all modes of travel,
- Secure public and agency support for the ultimate vision, and
- Develop a detailed implementation plan outlining future improvements, sequencing/triggers, timing, cost, and agency responsibility.

The purpose of this report is to document existing and no-build conditions and to identify and confirm issues along and near Highway 169 within the Cities of North Mankato and Mankato and the South Bend

Township area. This information will guide the development of plan goals and objectives and ultimately the identification of improvement alternatives for Highway 169.

This memo is organized by the following sections:

- Previous studies overview
- Planned projects
- Demographics and trends
- Functional classification and jurisdiction
- Study area characteristics
- Land use and major traffic generators
- Existing and no-build traffic conditions
- Crash history
- Access
- Pedestrian and bicycle
- Transit
- Social, environmental, and economic (SEE) resources
- Summary of issues

Appendix A of this memo contains figures of each of the study area characteristics listed above and SEE resources.

A. Previous Studies

Several studies have been completed which provide direction for future transportation needs within and around Highway 169. The key points in each study relevant to the Highway 169 area are summarized below by plan title.

MAPO 2045 LRTP (November 2015)

The Mankato/North Mankato Area Planning Organization's (MAPO) Long Range Transportation Plan (LRTP), guided by MAPO's Technical Advisory Committee (TAC) and Policy Board was published in 2015 to share long-range and short-range transportation planning strategies and actions that contribute to the development of and integrated multimodal transportation system with the capacity to facilitate the safe and efficient movement of people and goods. The geographic extent of the plan included Blue Earth and Nicollet counties; the cities of Mankato, North Mankato, Eagle Lake, and Skyline; and the townships of Belgrade, Lime, South Bend, LeRay and Mankato. All member jurisdictions were included in the development of the plan. The following provides a summary of findings from this study:

- A system management and preservation approach should be applied to preserve the principal arterial system, extend the capacity of current transportation facilities, and maximize highway efficiency.
- Identified Downtown (Civic Center) Mankato, Mankato West High School, Mankato City Hall/Government Center, Minnesota State University as high-risk emergency and disaster response areas adjacent the Highway 169 corridor
- The Highway 169 and Highway 14 Interchange is an issue area with crash rates exceeding critical thresholds, intersection and corridor deficiency, and access spacing less than minimum requirements.
    - An intersection operations analysis found that high mainline speeds, in combination with significant southbound traffic volumes, limit the availability of acceptable gaps for

eastbound left-turning motorists, causing significant side-street delays (LOS F) and queues at the Highway 169/Highway 14 South Ramp intersection
    - Identified crash types at the south ramp intersection were rear-end crashes at side-street stop control intersection
    - Potential improvements include installation of a warning sign, traffic control improvement, interchange reconfiguration and access modifications
- The Highway 169 and Lind Street intersection exceeds typical crash rates but does not exceed calculated critical rates
    - Identified crash types were rear-end crashes at a signalized intersection
    - Potential casual crash factors included large turning movement volumes and inadequate signal timing
    - Potential improvements including a traffic control improvement, re-timing of the signal, interchange reconfiguration and access modification
- The Highway 169 from Highway 14 South Ramp to Webster Avenue exceeds the typical crash rate but does not exceed the calculated critical rate
    - Identified crash types include rear-end crashes
    - Potential casual factors include excessive speeds, significant queues large turning movement volumes, and inadequate signal timing
    - Potential improvements including reduced speed limit with enforcement, re-time signals, interchange reconfiguration and access modifications
- Includes five design concepts reviewed by MnDOT and previous MATAPS efforts at the Highway 169 and Highway 14 interchange
- Includes several other low-cost/high-benefit solutions along the Highway 169 corridor for access control and traffic signal management

City of Mankato Riverfront Drive Corridor Study (June 2017)

In June 2017, the Mankato/North Mankato Area Planning Organization (MAPO) published the Riverfront Drive Corridor Study which identified a long-term vision for multimodal improvements on Riverfront Drive to help address pedestrian safety, speed issues, and freight and local access for businesses along the corridor. The study was led by MAPO and the City of Mankato. The study extent included Riverfront Drive from Woodland Avenue on the south to Highway 14 on the north.

The study partners desired to define a comprehensive vision for Riverfront Drive to continue their momentum in City Center reinvestment while also serving continued growth and local/regional mobility needs over the next 25 years. The study included defining the issues and potential opportunities along the corridor, establishing the corridor vision and goals, developing and evaluating potential multimodal infrastructure improvement alternatives, and developing a short- and long-term implementation plan that identifies potential projects and cost estimates.

The study included the following findings and recommendations relevant to the Highway 169 corridor.

- Peak hour queuing at the Riverfront Drive/Highway 169 interchange from both northbound and southbound directions.
- Improvements at the southbound Riverfront Drive/Highway 169 interchange ramp and additional turn lanes and access configurations between the interchange and Stoltzman Road.

Belgrade Avenue Corridor Study (July 2017)

In July 2017, the Mankato/North Mankato Area Planning Organization (MAPO) and the City of North Mankato completed the Belgrade Avenue Corridor Study to identify a long-term vision for multimodal

improvements on Belgrade Avenue in North Mankato. The study extent included Belgrade Avenue from Lee Boulevard on the west to the Veteran's Memorial Bridge on the east. The study defines a comprehensive vision for Belgrade Avenue to understand the needs and opportunities in the corridor, develop and evaluate potential transportation improvement alternatives, and develop an implementation plan that prioritizes projects for completion over time. The study included the following findings and recommendations ranging from short- to long-term for five focus areas along the corridor relevant to the Highway 169 corridor:

- Highway 169 Southbound Ramp Intersection: construct a roundabout for traffic calming

MAPO ADA Transition Plan (May 2019)

The Mankato/North Mankato Area Planning Organization (MAPO) ADA – Transition Plan & Inventory for Public Right-of-Way was published in May 2019 as part of requirements laid out in the Americans with Disabilities Act (ADA). The ADA requires MAPO and partner agencies to conduct self-evaluations of facilities within public rights-of-way and develop a transition plan detailing how the agency will ensure all facilities are accessible to all individuals. The study includes evaluations of MAPO member jurisdictions including Blue Earth and Nicollet counties and the cities of Mankato, North Mankato, Eagle Lake, and Skyline.

Implementation of the plan was separated into priority levels ranging from high priority to low priority. MAPO partner agencies used the priority ranking outlined above to create the plan and schedule for integrating ADA compliance projects in future streets projects. Each agency utilized two methods for upgrading pedestrian facilities to the current ADA standards. The first is the scheduled street and utility improvement projects. All pedestrian facilities impacted by these projects were recommended to be upgraded to current ADA accessibility standards. The second method is the stand-alone sidewalk and ADA accessibility improvement project. These projects were recommended to be incorporated into the Capital Improvement Program (CIP) on a case by case basis as determined by agency staff. The study found that the following sidewalks, pedestrian ramps, bus stops, and traffic signals along the Highway 169 corridor were not compliant with ADA accessibility standards:

- Priority area at Highway 169 and Kiwanis Recreation Area
- Eight not compliant pedestrian ramps at W Lind Street & Highway 169
- Priority area at CSAH 33 and Highway 169
- Two sidewalk barriers at S Riverfront Drive & Highway 169
- Six not compliant pedestrian ramps at S Riverfront Drive & Highway 169
- Three sidewalk barriers at Highway 169 and the Blue Earth River Crossing
- Four traffic signals at the Highway 169 & Lookout Drive ramps are not compliant
- Two not compliant pedestrian ramps at Sherman Street & Highway 169
- One sidewalk barrier at Sherman Street & Highway 169
- Three not compliant pedestrian ramps at Center Street & Highway 169
- One not compliant pedestrian ramp at Belgrade Avenue & Highway 169

City of Mankato Transit Development Plan (June 2018)

In June 2018, the City of Mankato published the Mankato Transit Development Plan. This plan explores the community's vision for a future transit system that increases access and reliability, encourages ridership

growth, and identifies additional opportunities for improvement in service and operations. The Greater Mankato Transit System (GMTS) serves 24 square miles in Mankato and North Mankato. In May 2018, GMTS operated 19 fixed route bus line and paratransit service.

The planning process identified three service recommendation scenarios. The scenarios give GMTS flexibility to begin addressing deficiencies in the existing system as funding becomes available.

- Cost neutral scenarios that maintain 2017 funding levels: removing deviations to increase travel time and reliability, transferring segments of routes to create more efficient connections, and realigning routes to adjust low performing routes
- New service expansion scenarios that add service funded by MnDOT grants: level of service improvements, route extensions to provide better connections to new and existing activity centers, and creating new routes to connect to new areas throughout the region
- Illustrative scenarios that include recommendations that address community feedback but are not yet funded: increased peak and all-day frequencies on existing routes, enhanced weekend service, extended weekday hours of service and new routes

City of Mankato Riverside North Redevelopment (Ongoing 2020)

The City of Mankato is in the process updating the plan for the Riverside North Redevelopment, adopted by the Council in the 1980's. The Riverside North Project area consists of approximately 24 acres located in the northwest section of the city. The area lies between Highway 169 and the Minnesota River, immediately south of Highway 14. The entire western side of the project area fronts on Highway 169. Plan updates are anticipated to include an area investigation/market analysis, land use/redevelopment scenarios, and a small area plan. Public engagement is also anticipated with the Mankato property owners/residents. The scope of the plan is only for areas along the corridor within the City of Mankato.

City of North Mankato Webster Avenue Land Use Study (Ongoing 2020)

This study covers the primarily industrial and commercial area along and around Webster Avenue in North Mankato between Highway 169 and Lake Street. Webster Avenue serves as a gateway to the City of North Mankato, providing access to a thriving commercial/industrial zone, area recreation, and residential neighborhoods in the area known collectively as Lower North Mankato. Businesses surrounding Webster Avenue rely on connections to US Highway 169 as many are oriented around the sale or maintenance of trucks and deliveries. Webster Avenue connects to US Highway 169 with an at-grade, full movement intersection today and is also near US Highway 14, providing vital regional connectivity.

As changes continue to develop across the North Mankato and Mankato region, the City of North Mankato is working to develop a vision for Webster Avenue to guide redevelopment and revitalization of the area. This study is intended to inform the MnDOT Highway 169 study by defining a vision of the Webster Avenue area that has the combined support of the City and area citizens, businesses, and property owners.

Webster Avenue handles a mix of vehicular traffic from tractor-trailer and large freight trucks down to passenger cars. Between 2011 and 2015, eight crashes occurred at the intersection of Webster and Range Street. The intersection receives traffic from Highway 169 and descends in elevation to the lower Webster Avenue below. With Spring Lake Park on the western terminus, Webster must also accommodate pedestrian and bicycle traffic coming primarily from the residential area south of the roadway. Access to the Webster Area is largely provided by the Webster Avenue and Highway 169 intersection. Each roadway within the industrial district feeds to Webster Avenue, with Cross Street and Range Street providing

north/south through access along the area's eastern edge. Each north/south roadway also provides access to residential areas south of Webster Avenue.

Goals and objectives of the ongoing study include:

- Direct Highway 169 access. Businesses expressed heavy reliance on Webster Avenue access to Highway 169 for the servicing of trucks, sales of trailers and parts to trucking customers, and shipments and deliveries by truck as the basis for their businesses. As such, most respondents agree that sustained direct access is vital to the continuation of their businesses and that loss of access would result in detrimental effects, including possible business closure.
- Continue to work with the Highway 169 Study Team and area stakeholders to outline a future for the Webster/Highway 169 intersection, while ensuring continued regional access to Webster Avenue from the highway.
- Coordinated wayfinding signage on Highway 169 and Webster Avenue to remove confusion for truck drivers finding their business.

City of North Mankato Comprehensive Plan (2015)

The Comprehensive Plan is a vision and roadmap for where the City of North Mankato is headed. The ideas and goals expressed in this plan are intended to reflect the community's values and the desire for what North Mankato is to become. The planning process identified the following as it pertains to Highway 169:

- The Land Use chapter gave recognition that Webster Avenue and Highway 169 is an area that people first see as they come into North Mankato and provide visitors with their first impression of the community. Webster Avenue has an opportunity to create a gateway into the community and let visitors know they are in North Mankato and will contribute to the creation of a "sense of place".
- The Transportation Plan provides information about previous planning efforts through the 2011 Mankato/North Mankato Area Transportation Planning Study (MATAPS) in which it identified; existing and potential deficiencies of the arterial-collector street system, the functional hierarchy of streets and roads related to access and capacity requirements, access management policies and intersection controls, and future planning through the Mankato/North Mankato Area Planning Organization's (MAPO) 2045 Long Range Transportation Plan.

  The Mankato Area Transportation and Planning Study (MATAPS), completed in 2011, included a comprehensive technical analysis and public outreach effort to identify transportation issues for the MATAPS area. The following major issues were identified specific to North Mankato and Highway 169:

  - Highway 14/Highway 169 interchange – safety and connectivity concern (eastbound on Highway 14 to northbound Highway 169); high-crash location
  - Highway 169 at Lind Street and Webster Avenue – local access and safety concerns
  - Trail expansion – potential trail expansion through the MATAPS study area and MAPO's Long Range
- The large vacant parcel at the northwest quadrant of the Highway 169/West Lind Street intersection lies within the City of Mankato and is designated for heavy industrial development on their land use map. The City of Mankato has also received inquiries from potential developers regarding the possibility of a large retail development being located on this site. Either an industrial or commercial/retail development could result in traffic impacts on the North Mankato local street

system, namely West Lind Street and North Lake Street. Lake Street north of Webster Avenue is designated as a local street in the proposed functional classification. It is the intent of the City of North Mankato that this segment of Lake Street remains a low-volume local street to preserve the unique character of the street corridor and the adjacent residential properties.

- Several scenarios for modification to the Highway 169 and Highway 14 interchange and for access modification to the segment of Highway 169 from Highway 14 interchange to Webster Avenue have been developed in the past. The primary objectives of the proposed improvements for the interchange are to eliminate the need to cross lanes of traffic when making the following turning movements; eastbound Highway 14 to northbound Highway 169, northbound Highway 169 to westbound Highway 14. Most of the improvement scenarios also included modification to the existing access conditions at the Lind Street and/or Webster Avenue intersections. Options considered included the removal of signals, closing access completely, or modifying access to right in/right out at one or both locations. During the last MATAPS updates in 2003 and 2011, the City of North Mankato staff and Council voiced opposition to any option that eliminated or reduced the level of access at Webster Avenue. Based on discussions with City staff and City Council, the position of the City of North Mankato has not changed on this issue. The City will not support options for improvements within this corridor that restrict access at the Highway 169/Webster Avenue intersection from today's full access condition. See the City of North Mankato Resolution No. 53-19 below for conditions regarding any option that includes relocating the Webster Avenue intersection.
- A policy relating to Highway 169 was listed in the Transportation System Goals, Objectives, and Policies, states that full access conditions be maintained at the Webster Avenue/Highway 14 intersection.

City of North Mankato Resolution No. 53-19 (adopted July 2019)

The City of North Mankato resolution No. 53-19 stated the following:

- In 1996, area government decided that an area transportation plan was needed. This resulted in a coordinated effort to produce the Mankato Area Transportation & Planning Study (MATAPS); and
- An update of MATAPS was completed in 2003 and 2012; and
- A reoccurring component of MATAPS was Highway 169 corridor improvements; and
- The Mankato/North Mankato Area Planning Organization Policy Board (MAPO) budgeted funds for the Highway 169 Corridor Study from Lake Street Northwest to State Highway 60 to be completed in 2019; and
- The proceeding with corridor studies requires a resolution of consent from local governments included in the study; and
- A critical intersection along the Highway 169 Corridor is at Webster Avenue where many North Mankato businesses rely on unrestricted access and turning movements on and off Highway 169; and
- In 2017, the City of North Mankato held business engagement meetings with area businesses to discuss the importance of the Highway 169 and Webster Avenue intersection; and
- It was evident that all participating area businesses believe that both north and southbound access from Webster Avenue to Highway 169 is critical; and
- The official position of the City of North Mankato is Webster Avenue shall remain open as a full access intersection with no restriction on turning movements and this has been North Mankato's position for over twenty years; and

- Webster Avenue is a critical full access intersection for both transportation and emergency response in Lower North Mankato; and
- The North Mankato City Council supports the inclusion of a Highway 169 Corridor Study in the 2019 MAPO work plan subject to the following condition:
    - The study will include maintain a full access intersection at Webster Avenue that is supported by the City of North Mankato
- If the study includes an option for relocating the Webster Avenue intersection, North Mankato's support for the recommendations is conditioned on the following:
    - All existing businesses in the corridor are provided with an economically viable and safe access.
    - Any new proposed location of the Webster Avenue intersection must remain within the boundaries (present or expanded) of the City of North Mankato.
    - Any new proposed location for the Webster Avenue intersection must include an area that is economically viable and feasible for redevelopment and reinvestment.
    - Any new proposed location of the Webster Avenue intersection must include a safe outlet for residents in Lower North Mankato, and that access point must be within the municipal boundaries (present or expanded) of North Mankato.

City of Mankato Strategic Plan (through 2023)

The City of Mankato Strategic Plan through 2023 acts as a guiding document for the City as it updates its services and initiatives. The plan outlines challenges and strategies intended to improve affordability, stewardship, and community building in Mankato. To increase transportation options and access for residents, the City plans to provide and promote affordable multi-modal transportation involving public and private partnerships and examine non-traditional modes and land use decisions that positively impact availability and feasibility. The following initiatives will be used to achieve these goals:

- Create opportunities for affordable transportation choices by developing and actionable multimodal plan and expanding the complete streets plan for bike/pedestrian connections.
- Establish innovative partnerships for expanded transit services by developing public/private partnerships to improve fixed route transit services in the City.
- Develop a transportation hub for local and regional connections and neighborhood transit stop locations that have passenger support elements.
- Apply transit supportive design by developing land use standards that encourage and support transit routes, such as high-density residential centers throughout the community.

City of Mankato Resolution No. R-19-0708-119 (adopted July 2019)

The City of Mankato resolution No. R-19-0708-119 stated the following:

- In 1996, a Highway 169 Corridor Plan was developed under the Mankato Area Transportation & Planning Study (MATPS) process; and
- The City of Mankato facilitated certain local road improvements, connections, and aspects of the MATAPS plan; and
- Subsequent updates to the MATAPS plan were mad in 2003, and again in 2010; and
- The public engagement process identified concerns on the part of Mankato property owners along he corridor that any closure and subsequent relocation of the Lind Street access to be done in a

manner that assures long-term economic vitality of the businesses and properties serviced by the Lined Street access; and

- The Highway 14/Highway 169 interchange is inadequate, and in particular, the turning movements from North Mankato Highway 14 to the Highway 169 ramp are in need of critical safety and operational improvements; and
- It is imperative that the corridor plan be prepared and included in the revised 10-year Long Range Transportation Plan for MnDOT District 7, so as to assure effective reinvestment of future state transportation funding and securing federal funding opportunities.
- The City Council for the City of Mankato that participation is authorized in the Highway 169 Joint Corridor Study provided that any alternatives which include the closure and relocation of Lind Street remain economically viable to the affected businesses and property owners within the City of Mankato
- The City of Mankato retains its rights of municipal consent over local street closures and access relocations identified through the Highway 169 Corridor Study process.

B. Planned Projects

A few projects are planned or programmed within and around the study area.

The following lists potential **MnDOT** bridge and pavement projects within the next 10 years:

- 2018 Highway 169 Levee Project including 0.8 miles just north of the Highway 14 junction raised to meet the 100-year base flood elevation
    - The issue of flooding and the Highway 169 elevation from Lake Street to Highway 14 remains an important issue for both communities and businesses in the area. The levee project raised Highway 169 to meet flood insurance requirements but not to an elevation the communities desire. Interchange improvements may require re-visiting this issue with the U.S. Army Corps of Engineers.
- The current draft Capital Highway Investment Plan (2020-2029) for District 7 includes a potential project on Highway 169 (from approximately Riverfront Drive to Lake Street) in 2027 that will include major bridge work on three primary bridges (including the Northstar Bridge), as well as pavement needs, potential bicycle and pedestrian infrastructure, freight needs, etc. It is estimated that this project may exceed $37,000,000, or almost one-third of the District budget for that year. Within the next 10-15 years it is anticipated that Bridge 07023 (Highway 14 over Highway 169) and Bridge 07011 (Highway 14 over Minnesota River and UP Railroad) will need to be addressed, which combined could exceed $100,000,000. MnDOT intends to use the vision established in this study and the needs of the region to inform these future investments.

City of Mankato planned projects:

- 2020 rehabilitation of pavement on Riverfront Drive from Woodland Avenue to Sibley Parkway

C. Demographics and Trends

This section provides an overview of past and projected demographics in the study area, to demonstrate how growth has and will impact demand for facilities.

Population and Households

The Mankato/North Mankato area has experienced steady growth since 2000. The MAPO area had an estimated population of 62,578 in 2012 and 65,175 in 2020, increasing 4%. Based on forecasts by MAPO the 2045 population is projected to be approximately 73,200, increasing an additional 12% from the 2020 estimation. **Tables 2** details population, households and employment trends for the MAPO area.

Rapid growth, such as that seen in the MAPO area has implications on transportation systems. Fast growth may increase demand for roadway capacity and lead to greater density to support increased transit or bicycle/pedestrian facilities. In addition, the study area corridors are also influenced by their travel sheds which go beyond the immediate study area. Further detail on this is provided in section II.C Land Use and Major Traffic Generators. Travel sheds will be identified early in the study by analyzing traffic pattern data.

Table 2: Populations, Households, and Employment within the MAPO area

Table 2: MAPO – Population and Households				
Category	**2012**	**2020**	**2030**	**2045**
Population[1]	62,578	65,175	68,400	73,200
Households[1]	24,235	26,800	30,300	34,300
Employment[2]	34,257	37,200	40,800	46,300

1 Extrapolated using year 2020 projections developed in the Mankato Area Housing Study Update
2 Extrapolated to correspond with MATAPS 2010 year 2035 employment projections
Source: MAPO 2045 Long Range Transportation Plan (LRTP) Update

Employment

The Minnesota Department of Employment and Economic Development (DEED) estimates approximately 59,399 jobs exist in the Cities of North Mankato and Mankato as of 2017. The average hourly earnings is $26.44/hour. The largest industries are manufacturing, health care and social assistance, and retail trade. 20.4% of workers are employed in the manufacturing industry which could mean an increased demand for highway efficiency.

Of these employees, the majority either drove alone or carpooled to work in 2017 (**Table 3**). This high reliance on driving single-occupancy vehicles could mean greater numbers of auto trips as population in the MAPO area increases, placing greater demand on the existing transportation infrastructure. Currently the average travel time for each jurisdiction is lower than the average travel time to work for Minnesota. The City of Mankato has the highest percentage of residents who use public transit to get to work, likely due to the level of availability of transit within Mankato serving more routes and destinations. This emphasizes the importance of multimodal transportation facilities.

Table 3 – Means of Transportation to Work, 2017					
Age	**North Mankato**	**Nicollet County**	**Mankato**	**Blue Earth County**	**South Bend Township**
Drove Alone	84.8%	76.7%	79.5%	80.9%	85.1%
Carpooled	6.4%	7.8%	7.3%	7.6%	4.5%
Walked	3.7%	3.9%	5.3%	4.0%	2.2%
Transit	0.7%	0.5%	2.2%	1.5%	0.4%

Other Means	1.2%	1.1%	1.4%	1.0%	0.7%
Mean Travel Time to Work (minutes)	16.4	17.9	15.5	17.3	16.4

Source: US Census Bureau

Minority, Low-Income, and other Vulnerable Populations

The following section is a summary of findings from the Environmental Justice Analysis in Appendix B. The Highway 169 corridor is located in Blue Earth and Nicollet Counties in Minnesota. The two counties combine for a population of 99,244. The corridor study area consists of census block groups that either fall significantly within 0.5 miles of the Highway 169 project corridor or is a key location just outside the 0.5-mile radius. There are 21 block groups in the Highway 169 analysis area which have a population of 30,797 people according to the 2017 American Community Survey 5-year Estimates (**Table 4**).

Table 4: Environmental Justice Populations in the Highway 169 Project Area

		Hwy 169 Project Area		Nicollet and Blue Earth Counties, MN	
		Count	Percent	Count	Percent
Race and ethnicity	**Population**	30,797	—	99,244	—
	White	27,691	90%	88,457	89%
	Minority population	3,548	12%	12,729	13%
	Hispanic or Latino	822	3%	3,562	4%
	African American	1,149	4%	3,141	3%
	Asian or Pacific Islander	442	1%	1,954	2%
	Two or more races	555	2%	1,806	2%
	Native American	66	0.2%	245	0.2%
	Some other race	72	0.2%	79	0.1%
Income	**Population for whom poverty status is determined**	30,420	—	93,466	—
	Income below 200% of the poverty level	8,510	28%	14,835	16%
Education	**25 years and older**	20,386	—	59,878	—
	Less than high school education	941	5%	3,525	6%
Language	**5 years and older**	28,781	—	93,641	—
	Speak English less than "very well"	387	1.3%	1,719	2%
	Speak Spanish	31	0.1%	705	0.8%
	Speak and other language	282	1%	466	0.5%
	Speak an Asian language	73	0.3%	457	0.5%
	Speak an Indo European language	1	0%	91	0.1%
Age	**Population**	30,797	—	99,244	—
	Under 5 years	2,016	7%	5,603	6%
	65 years and older	4,205	14%	13,384	13%
Housing	**Households**	12,729	—	38,220	—
	Owner occupied households	8,472	67%	25,066	66%
	Renter occupied households	4,257	33%	13,154	34%
Disability	**Population for whom disability status is determined**	35,555	—	98,443	—
	Population with a disability	3,792	11%	10,240	10%
Vehicles	**Households**	5,042	—	38,220	—
	No vehicle households	539	11%	2,654	7%

**Data from census tracts. All other data is from the block group level.*

Rental and Low-Income Housing

About 33% of the housing in the study area is renter occupied compared to 34% of the occupied housing in Nicollet and Blue Earth Counties.

The neighborhood north of where the Blue Earth River meets the Minnesota River has a high concentration of minority and low-income individuals and contains a number of large multi-unit housing including the Villa Terrace Apartments (1560 Tower Blvd), Hoover Estates Apartments (1866 Lee Blvd), Lee Estates Apartments (1740 Lee Blvd), Roe Crest Estate Apartments (1604 Roe Crest Drive), Colony Apartments (1621 Colony Ct), Allen Avenue Apartments (301 Allan Ave), and Village Court Apartments (1620 Village Ct), as

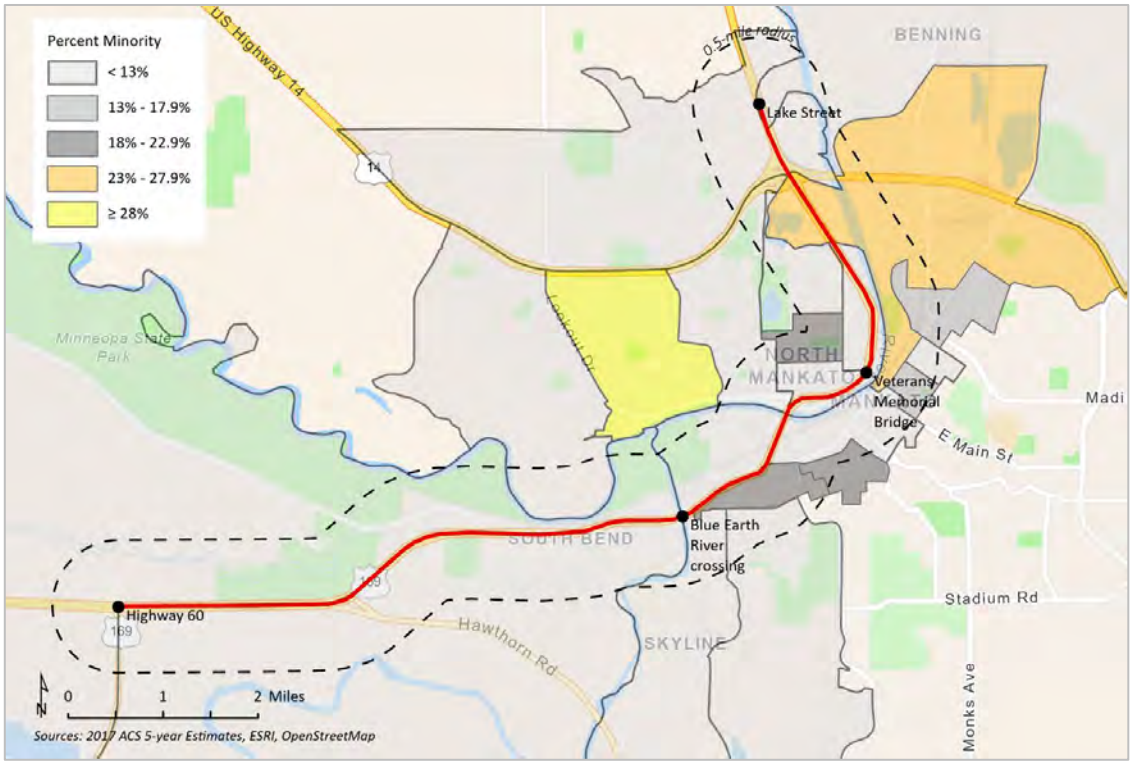
well as several other smaller multi-unit buildings and single family units. The area directly surrounding the Highway 14 intersection contains mostly businesses and the Kiwanis Recreation Area, with the notable exception of the Park Place Townhomes just south of Hiniker Pond (281 Butterworth Street).

Minority Populations

Minority populations includes individuals who identify as Hispanic or Latino, Black or African American, Asian American or Pacific Islander, Native American, some other race, or two or more races, as defined by the U.S. Census Bureau. There are two block groups above 23 percent minority populations that fall within the project area (**Figure 2**) and can be considered environmental justice populations.

The yellow block group north of the Minnesota River has the highest concentration of minority individuals in project area with 34 percent (Figure 2). The block group contains a number of large multi-unit dwellings as well as several other smaller multi-unit dwellings and single-family homes. The orange block group that crosses the segment between Lake Street and Veterans Memorial bridge south of Highway 14 has mostly businesses west of the Minnesota River, with the notable exception of the townhomes south of Hiniker Pond.

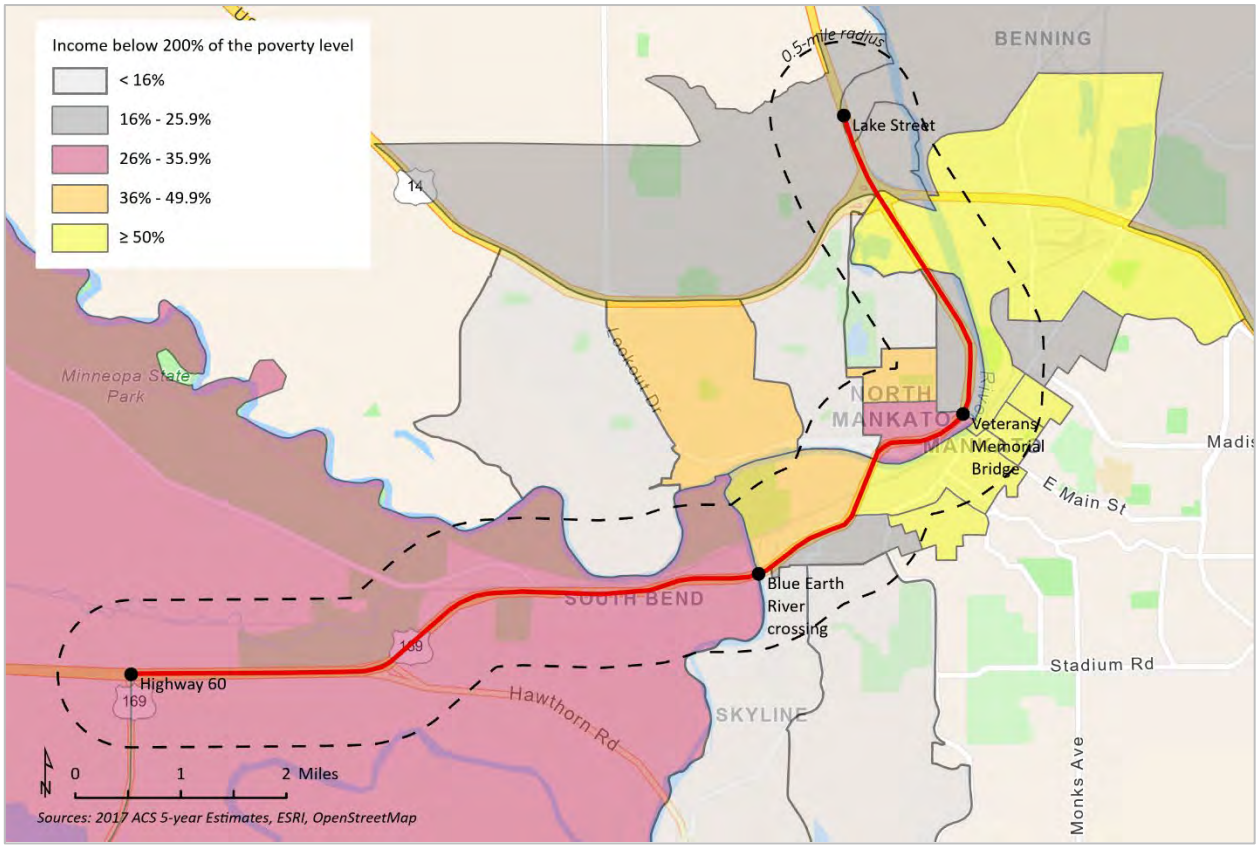
Figure 2: Percent of Minority Individuals by Block Group in the Highway 169 Project Area



Low-Income Populations

A low-income population is defined as one where the block group contains a 10 percent higher concentration of low-income individuals than the county average. There are 11 block groups above 26 percent low-income populations that fall within the project area (**Figure 3**). The block groups range between 26 percent and 70 percent of populations that have low incomes. Due to the significantly greater low-income concentrations compared to the general population than the counties, all 11 block groups can be considered environmental justice populations.

Figure 3: Percent of Low-Income Individuals by Block Group in the Highway 169 Project Area



Education

About 5% of the population aged 25 years or older living in the study area has less than a high school education compared to 6% for the overall populations of Nicollet and Blue Earth Counties.

Language

About 1% of the population living in the study area speaks a language other than English and speaks English less than "very well" compared to 2% for the overall populations of Nicollet and Blue Earth Counties. Of those people who speak English less than very well in the study area, most speak a language not identified in the ACS 5-year estimates (an "Other" language).

Age

The age distribution of a jurisdiction **(Table 5)** is important because it affects transportation usage. In 2017, the largest population group in the MAPO area was residents between 20-34 years old. A large portion of this age group lives in Mankato, partially due to the Minnesota State University, Mankato campus.

About 7% of the population living in the study area is under 5 years old compared to 6% for the overall populations of Nicollet and Blue Earth Counties. South Bend Township and North Mankato have greater percentages of residents under 18 years old than the state of Minnesota or the rest of the MAPO area. This may mean greater demand for transportation alternatives or safe routes to school programs. About 14% of the population living in the study area is 65 years and over compared to 13% for the overall populations of Nicollet and Blue Earth Counties. In South Bend Township, the percentage of residents over 65 years old is

much higher than the rest of the MSA and State of Minnesota at 20.2%. This percentage indicates the importance of dial-a-ride transit services.

Table 5 – Age Distribution, 2017			
Age	**North Mankato**	**Mankato**	**South Bend Township**
Under 5	903	2,263	124
5-9	969	1,912	139
10-14	868	1,967	175
15-19	835	4,350	48
20-24	611	9,798	67
25-34	2,090	5,842	254
35-44	1,716	3,843	203
45-54	1,611	3,212	215
55-59	1,030	1,681	129
60-64	973	1,844	98
65-74	1,038	2,228	114
75-84	609	1,546	125
85 and Over	330	755	129
Median Age	38.0	25.5	40.6
% Under 18	24.4%	17.1%	26.2%
% Over 65	14.6%	11.0%	20.2%

Source: US Census Bureau

Disability

Although not an EJ population, it is important to be aware of the people with disabilities in the project area. About 11% of the population for whom disability status is determined has a disability in the project area compared to 10% for the overall populations of Nicollet and Blue Earth Counties.

Household Without a Vehicle

Although not an EJ population, it is also important to be aware of the number of households in the project area without a vehicle. About 11% of households in the project area do not have a vehicle compared to 7% for the overall households in Nicollet and Blue Earth Counties. Staff will need to work with locals to identify how to best reach these households that live near the project area.

II. Transportation System Characteristics

This section describes elements of the existing transportation network, information related to land use, traffic operations, safety, access, and non-motorized connections. This section concludes with a review of known social, economic, and environmental (SEE) resources considerations within the study area.

A. Functional Classification and Jurisdiction

The functional classification system is used to create a roadway network that efficiently collects and distributes traffic from neighborhoods to the state highway system. A successful system coordinates and manages mobility, roadway design, and route alignment as well as seeks to match current and future access and land use with the adjacent roadway's purpose, speeds, and spacing. The functional classification system is comprised of principal arterials, minor arterials, major and minor collectors, and local roadways.

Highway 169 serves as a north-south principal arterial and National Highway System (NHS) route. It provides direct and relatively high-speed connections to southern Minnesota and beyond and to the north to the Twin Cities Metropolitan Area and northern Minnesota. The existing ADT (vehicles per day) ranges from 16,600 at the north end to 32,500 in the middle and 23,600 at the southern end of the study area. **Figure 4** (Appendix A) shows the existing functional classification network in the study area.

Highway 169 functions as a hybrid freeway-expressway in the MAPO planning area, with access restricted to grade-separated interchanges through the urban core of Mankato and North Mankato and at-grade (signalized and unsignalized) access points as the corridor extends radially from the urban core. The middle subarea (Blue Earth River crossing to Veterans' Memorial Bridge) is the only full freeway segment in the study area with a four-lane corridor. The northern subarea (Veterans Memorial Bridge to Lake Street) and southern subarea (Highway 60 to the Blue Earth River crossing) are both a four-lane divided expressway corridor.

One other principal arterial, US Highway 14/Trunk Highway 60, and six minor arterials connect to Highway 169 in the study area. Minor arterials include Belgrade Avenue/Mulberry Street, Lookout Drive, Riverfront Drive, Trunk Highway 68, Gadwall Road/County State Aid Highway (CSAH) 69), CSAH 33, CSAH 69/Hawley Street, and Hawthorn Road/CSAH 90).

Figure 5 (Appendix A) shows the roadway jurisdiction in the study area.

B. Study Area Overview

For ease in describing key corridor characteristics in more depth, the corridor is split into three subareas based on the unique context within each.

Northern Subarea - The northern subarea runs from the Veterans Memorial Bridge to Lake Street. This segment is a four-lane divided expressway with a speed limit of 50 mph.

Middle Subarea – The middle subarea runs from the Blue Earth River crossing to Veterans Memorial Bridge. This is a four-lane divided freeway corridor with a speed limit of 50 mph.

Southern Subarea – The southern subarea runs from Highway 60 to the Blue Earth River crossing. This is a four-lane divided expressway corridor with a speed limit ranging from 50 to 65 mph.

The sections below provide additional detail on these three subareas.

C. Land Use and Major Traffic Generators

Existing and future land uses in the study area are shown on **Figures 6 and 7** (Appendix A) and described below. At the time of creating this existing conditions report, the Cities of Mankato and North Mankato

were in the process of updating their future land use plans. **Figure 7** includes a map from the Cities of North Mankato and Mankato's latest Comprehensive Plan update. When each process is complete, the updated future land use plan will be reflected here and in other relevant Highway 169 Study documentation. There is currently no future land use plan for South Bend Township and the southern subarea of this study.

Northern Subarea

The northern subarea is within the Cities of Mankato and North Mankato. North of the Highway 169 and Highway 14 interchange is primarily park and open space with some commercial land use. The Kiwanis Recreation Area is a 100-acre, regional destination, many-featured, park including 5-miles of mountain bike trails, cross country ski trails, other trials, dog park, archery range, water access, camping, and a large picnic shelter. South of the Highway 169 and Highway 14 interchange is a large concentration of commercial, heavy industrial, light industrial, residential, and public/institutional land uses served by Lind Street and Webster Avenue connections to Highway 169. This concentration of commercial and industrial land use is a major local and regional traffic generator served by its direct access to Highway 169 and proximity and ease of access to the Highway 169 and Highway 14 interchange. This area also includes high-density residential near Hiniker Pond with access off Lind Street and access to residential neighborhoods, parks and schools in Lower North Mankato via Webster Avenue.

As Highway 169 moves towards the Veterans Memorial Bridge, direct access spacing becomes more distant, with the surrounding land use being dominated by low density residential. Both the North Mankato and Mankato central business districts can be accessed by the Highway 169/Veterans Memorial Bridge interchange.

Middle Subarea

The middle subarea also includes the Cities of Mankato and North Mankato, with the land uses directly adjacent Highway 169 dominated by low and medium density residential and heavy industrial along the eastern edge of the Minnesota River. Other adjacent land uses include high density residential, mixed use, commercial, and public/institutional. North Mankato Fire Station #1 has access to Highway 169 via Lookout Drive.

As the only full freeway segment there is no direct access, traffic movements rely heavily on the Veterans Memorial Bridge, Lookout Drive, and South Riverfront Drive interchanges. These interchanges also provide critical connections to Downtown Mankato for northbound Highway 169 travelers, in addition to the local roadway network in this area for access to West Mankato, southern Mankato and the Minnesota State University, Mankato campus, lower and upper North Mankato, and across the Minnesota and Blue Earth Rivers. This subarea also provides the only two connections across the Minnesota River; at the Veterans Memorial Bridge and the Northstar Bridge, for access between communities.

Southern Subarea

The southern subarea is located in South Bend Township and includes primarily agriculture, low density residential and park and open space land uses directly adjacent Highway 169, with sparse areas of commercial and light industrial.

Connectivity of the local roadway network is inhibited in many areas by topography, including steep slopes and natural areas, the Union Pacific Railroad, the Minnesota and Blue Earth Rivers and adjacent land uses. Limited local network connectivity put pressure on Highway 169 and conversely, any change in access will put pressure on the local system.

Regional Multimodal Corridor

Located in south central Minnesota, the Mankato/North Mankato metropolitan planning area is 75 miles south of Minneapolis-St. Paul at the junction of Highway 14 and Highway 169. The area has experienced widespread growth across the metropolitan area and serves southern Minnesota as a hub for health care, education, retail, agriculture, and industry.

Highway 169 is the primary transportation corridor for funneling freight into the Twin Cities from the Mankato/North Mankato region and southern Minnesota. This area produces almost half of Minnesota's corn, soybeans and ethanol, making Minnesota third in the nation for production among all states. Other major commodities moving along this corridor include aggregates, clay and sand, hogs, manufactured goods and food products. Other key freight attributes of the Highway 169 corridor between Mankato and the Twin Cities include:

- Moves the equivalent of 30,000 tons of freight by truck per day with an average daily vehicle count of 1,200 – 3,700 heavy commercial vehicles.
- Carries the fifth heaviest freight volume of any highway in Minnesota – the top four are I-94, I-90, I-35 and MN 52.
- Connects major producers of ethanol, biodiesel, and other byproducts to markets and refiners along MN 60 and the adjacent Union Pacific Railroad.
- Provides one of two major conduits to the Ports of Savage for grain exports via the Minnesota and Mississippi River systems.

III. Environmental Screening

This section documents findings related to potential environmental impacts within the footprint of the Highway 169 corridor project. The complete Environmental Screening Summary with more detail and mapping can be found in Appendix C. This includes identification of potentially sensitive areas by considering all National Environmental Policy Act (NEPA) protected social, economic, and environmental categories and will be used as a primer for required NEPA and state environmental reviews later in the project, and will be used to inform and evaluate corridor alternatives.

D. Cover Types

The corridor zone for the Hwy 169 area, as defined as the 0.5-mile radius around the corridor, includes about 6,000 acres of land in Blue Earth and Nicollet Counties. Land cover data for the area was obtained from the National Land Cover Database. Cover types are listed by acreage in the corridor zone in Table 6. About half of the land overall is developed land in the corridor zone. A majority of the cover in the Northern subarea and nearly all of the cover in the middle subarea consists of developed land. A little more than one-fourth of the land in the Southern subarea is developed while other large portions of land consist of cropland and wooded area.

Table 6: Existing cover types in the project subareas

Cover Type	Northern Subarea (Acres)	Middle Subarea (Acres)	Southern Subarea (Acres)	TOTAL
Open Water	162	70	132	364
Developed	1,067	1,109	861	3,037
Barren Land (Rock/Sand/Clay)	30	5	207	242
Wooded/forest	102	4	523	629

Cover Type	Northern Subarea (Acres)	Middle Subarea (Acres)	Southern Subarea (Acres)	TOTAL
Grassland	111	8	340	460
Cropland	109	0	673	782
Wetland	117	7	365	489
TOTAL	**1,698**	**1,203**	**3,101**	**6,003**

E. Geology, Soils and Topography/Land Forms

Elevations range from 774 feet at the Highway 169 intersection at TH 60 to 994 feet at the Highway 169 and Lake Street intersection, an elevation change of 200 feet.

Soil data were obtained from the NRCS Web Soil Survey for Blue Earth and Nicollet Counties. Table 2 lists the 60 different soils present by acreages in the corridor zone, organized by the overall acres for the entire corridor zone. This information will be used to assess various soil limitations such as hydric characteristics and the limitations for local roads and streets.

F. Water Resources

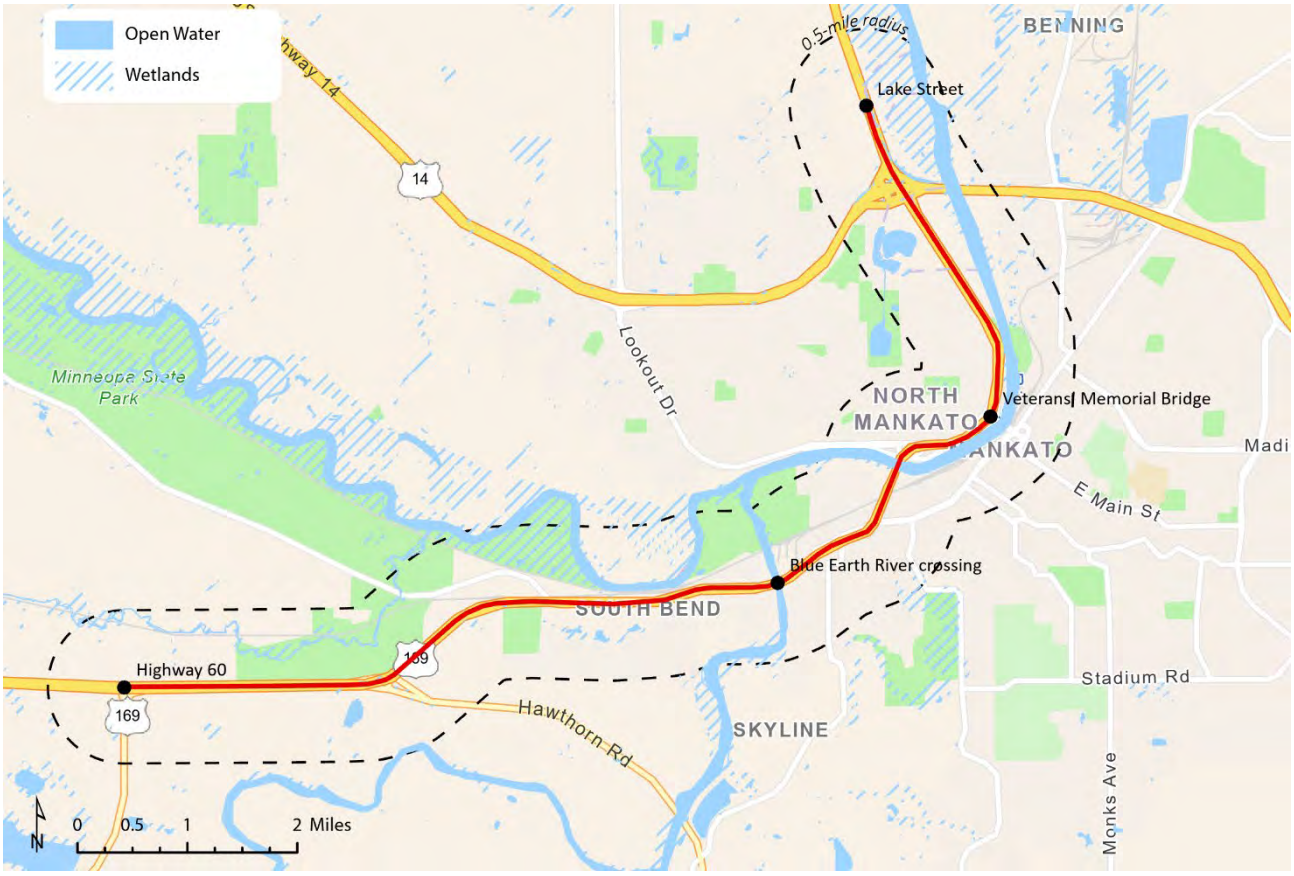
Water resources data from the National Wetlands Inventory shows approximately 935 acres of water resources exist within the 0.5 miles of the corridor zone and include rivers, ponds and wetlands (Figure 3). Hwy 169 runs to the west of the Minnesota River in the northern subarea and then crosses the River in the middle subarea. The Minnesota River bends outside of the 0.5-mile corridor zone in the middle subarea but then bends back to run adjacent to the north of Highway 169 for approximately 0.75 miles in the southern subarea. The Blue Earth River bisects the middle and southern subareas. There are many small unnamed ponds in the areas surrounding the two rivers.

Other major water features include Hiniker Pond which lies to the west of Highway 169 in the northern subarea to the southwest of the Highway 169/Highway 14 interchange. There are also two unnamed ponds in the Kiwanis Recreation Area, to the northeast of the Highway 169/Highway 14 interchange.

In addition to the open water features, many of the areas around the rivers and ponds are designated as wetlands, either freshwater emergent or freshwater forested. Table 3 lists the types of water features present within the corridor by acreage.

A locally controlled levee exists within the corridor on the river side of Highway 169 to minimize flooding associated with high water levels in the Minnesota River. The levee is a combination of earthen berm and concrete floodwall that provides flood protection for North Mankato, Mankato, and LeHillier when the River is at flood stage. Until recently, the levee had a gap in protection that existed north of the Highway 169/Highway 14 interchange. A project in 2018 closed this gap in the levee by raising the elevation of Highway 169 just north of the Highway 14 interchange. At this location, Highway 169 and Highway 14 are considered a part of the levee.

Figure 8: Water Resources



G. Contaminated/Hazardous Materials/Wastes

Potentially contaminated site data was obtained from the MPCA's What's in My Neighborhood dataset. There are 479 potentially contaminated sites in the corridor zone. Potentially contaminated sites include sites with any activity that may lead to toxic or hazardous contamination. There are 156 potentially contaminated sites in the northern subarea, 262 in the middle subarea, and 61 in the southern subarea. The highest type of activity for potentially contaminated sites in the corridor zone include hazardous waste sites. Hazardous waste is hazardous waste is dangerous or potentially harmful effect on human health or the environment. There are 161 total hazardous waste sites throughout the entire corridor zone with 55 hazardous waste sites in the Northern subarea, 87 in the middle subarea, and 19 in the southern subarea.

H. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources

Native plant communities in the corridor zone were identified using the MnDNR's Native Plant Communities dataset for sites surveyed by MnDNR ecologists. Most of the native plant communities exist in the southern subarea, a majority of which are Pin Oak – Bur Oak Woodlands. There is a Red Oak - Sugar Maple - Basswood - Forest directly adjacent to the corridor in Minneopa State Park, north of the intersection at Highway 169 and Hawthorn Road.

Only 12 acres of surveyed sites native plant communities exist in the Northern subarea—on the east side of the Minnesota River across from the Kiwanis Recreation Area—and no native plant species exist in the developed middle subarea. The low numbers in may be due to a lack of surveyed sites in those two subareas. One area to keep in mind for the project is the Kiwanis Recreation Area in the Northern subarea.

Most of the corridor has been previously disturbed for development or is used for agriculture. As such, habitat present in the corridor zone and vicinity has been fragmented or degraded. In general, the corridor zone consists of the MnDOT right of way of Highway 169. Natural resources in the corridor zone consist of scattered stands of trees, landscape plantings that line the Highway 169 right of way, grassy areas, lakes, streams, minor rock outcroppings, and wetlands. Grassed areas are primarily in the right of way of Highway 169.

Any wildlife displaced by any projects or construction resulting from the completion of this study will likely relocate to suitable nearby areas, including lands immediately adjacent to the corridor zone. There will be vegetation impacts because of the project, including the removal of trees and shrubs primarily located within the right of way of Highway 169. Landscaping or reseeding with native plants will be used to mitigate impacts as a result of the project.

I. Visual

The corridor zone views consist of a mixture of open space, commercial and residential. The northern subarea includes some views of strip mall commercial developments, low to medium density residential, and open space that include trees, grass and shrubs along Highway 169. The middle subarea view includes downtown commercial and medium density residential. Views of the rivers in the middle subarea are mostly obstructed by development or freeway barriers except on the Minnesota River bridge and Blue Earth River bridge crossings. The southern subarea consists of open space, low-density residential, and commercial views.

J. Air, Noise, and Cumulative Potential Effects

Air, noise and cumulative potential effects will be considered in a future NEPA analysis once a project is funded.

Recreational Land Effects

Since recreational land is adjacent to the highway right-of-way there may be a need to obtain land from these properties. This means right-of-way processes and construction plans will need to be coordinated with the Federal Highway Administration, Mn Department of Natural Resources, the local owners of jurisdiction, and potentially the National Park Service.

Cultural and Historic Properties

Cultural and Historic properties will need to be reviewed when specific projects are identified for this corridor. Even though there are no designated tribal lands in this area, the confluence of the Blue Earth and Minnesota Rivers has cultural significance for the Dakota people.

IV. Existing Traffic Conditions

Existing Traffic Operations

Due to irregular traffic patterns because of the COVID-19 pandemic, existing traffic counts could not be obtained using traditional collection methods. The project management team agreed upon an alternative approach to establish existing traffic counts. This alternative approach consists of the following:

Step 1. Identify all available data within the last 10 years

- Automatic traffic recorder (ATR) data – Blue Earth River Crossing
- Traffic counts from previous studies
- Previously completed plans and studies

Step 2. Apply additional information

- Obtain turning movement patterns/breakdowns by approach using StreetLight Insight. Compare to previous counts if applicable
- Obtain latest annual average daily traffic (AADT) from MnDOT Traffic Mapping Application. In locations where 2019 draft AADT is lower than previously published count use the older count volume
- Determine peak hour percentages from automatic traffic recorder (ATR) data and previous counts
- Apply peak hour percentages to latest AADT data to determine peak hour entering/exiting traffic volumes
- Enter the peak hour entering/exiting volumes and percentage breakdowns of each turning movement from StreetLight Insight into the TurnsW32 program to calculate counts
- For locations without any previous count data use the ITE Trip Generation Manual to calculate peak entering/exiting traffic volumes
- Confirm that turning volumes are higher than or equal to the latest turning movement count where previous counts were completed
- Balance turning movement counts between intersections

Figure 9A in Appendix A shows the existing turning movement counts that were derived based on steps 1 and 2. **Figure 9B** in Appendix A shows the previous turning movement count data provided by the local agencies.

The existing peak hours were analyzed in Synchro/SimTraffic to understand delay and queuing issues throughout the project area. Signal timing was provided by MnDOT. Heavy vehicle percentages were obtained from previous counts available.

The following intersections are signalized throughout the project area:

- Lind St at TH 169
- Webster Ave at TH 169
- Belgrade Ave at SB TH 169 Ramps
- Belgrade Ave at NB TH 169 Ramps
- Riverfront Dr at SB TH 169 Ramps

The average intersection control delay is a volume-weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from Level of Service (LOS) A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D are generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays. **Table 7** shows the intersection delay as well as the maximum delay of all movements at each intersection.

Table 7 – Existing Traffic Operations Analysis Results												
Intersection	A.M. Peak Hour						P.M. Peak Hour					
	Intersection		Maximum Movement				Intersection		Maximum Movement			
	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
Lake St NW (North Access) at TH 169	1	A	WBL	27	D	25	2	A	WBL	41	E	50
Lake St NW (Southern Access) at TH 169	1	A	NBL	6	A	75	1	A	NBL	9	A	100
WB TH 14 Entrance Ramp at TH 169	1	A	NBL	8	A	75	2	A	NBL	12	B	100
EB TH 14 Exit Ramp at TH 169	5	A	EBL	31	D	175	7	A	EBL	81	F	275
Lind St at TH 169	16	B	NBL	49	D	75	18	B	SBL	48	D	225
River Ln at TH 169	4	A	NBR	8	B	-	5	A	NBR	9	A	-
Webster Ave at TH 169	16	B	SBL	69	E	50	19	B	SBL	64	E	75
Monroe Ave at TH 169	5	A	EBR	13	B	125	4	A	EBR	10	B	100
Belgrade Ave at SB TH 169 Ramps	15	B	SBL	30	C	200	14	B	SBL	35	D	175
Belgrade Ave at NB TH 169 Ramps	3	A	NBL	18	B	50	7	A	NBL	21	B	75
Owatonna St at SB TH 169 Ramps	3	A	NBT	29	D	50	3	A	SBT	3	A	25
Riverfront Dr at SB TH 169 Ramps	23	C	SBL	33	C	375	21	C	SBL	34	C	300
Riverfront Dr at NB TH 169 Ramps	6	A	NBL	33	D	25	5	A	NBL	22	C	50
CSAH 69 (Hawley St) at TH 169	5	A	WBL	32	D	300	2	A	WBL	12	C	50
CSAH 33 at TH 169	3	A	NBL	50	F	75	21	C	NBL	423	F	850
TH 68 at TH 169	3	A	SBL	18	C	175	5	A	SBL	34	D	225
CSAH 69 (Gadwall Rd) at TH 169	2	A	SBL	16	C	50	3	A	SBL	26	D	75
CSAH 90 at TH 169	1	A	WBL	3	A	50	1	A	WBL	8	A	50
TH 60 at TH 169	6	A	NBL	28	D	75	7	A	NBL	145	F	75

*Delay in seconds per vehicle.

The existing operational analysis indicates that all intersections overall operate with acceptable delay of LOS C or better. The following intersection have a movement that operates with LOS E or F during the peak hours:

- Lake St NW (North Access) at TH 169: EBL and WBL operate with LOS E (PM Peak)
- EB TH 14 Exit Ramp at TH 169: EBL operates with LOS F (PM Peak)
- Webster Ave at TH 169: SBL operates with LOS E (both peaks)
- CSAH 33 at TH 169: NBL operates with LOS F (both peaks), NBR operates with LOS F (PM Peak), and WBL operates with LOS E (PM Peak)
- TH 60 at TH 169: NBL operates with LOS F (PM Peak)

Traffic queuing issues were also identified in the existing operational analysis. The following queues were found to be problematic:

- Lind St:
    - Maximum NBT queue blocks turn lanes during both peak hours
    - Maximum WB queues extend beyond Lind Ct during both peak hours

- Webster Ave:
    - Average EBL/T queues extend to Range St (located approximately 175 ft from TH 169) during the AM peak hour and beyond Range St during the PM peak hour
    - Maximum EBL/T queues extend 325 ft during the AM peak hour and 425 ft during the PM peak hour blocking business driveways.
    - Maximum EBR queue extends to Range St during both peak hours
    - Maximum WBL/T queues extend to River Dr (located approximately 70 ft from TH 169) during the AM peak hour
    - Maximum WBL/T/R queues extend onto River Dr during the PM peak hour
- Belgrade Ave at SB TH 169 Ramps:
    - Maximum EBT queue extends past Nicollet Ave (located approximately 125 ft from the intersection) during both peak hours
    - Maximum WBL queue extends beyond the turn lane during the PM peak hour
- Riverfront Dr at SB TH 169 Ramps:
    - Maximum SB queues extend past Owatonna St (located approximately 200 ft from Riverfront Dr) during both peak hours, however the queues do not extend onto TH 169.
- Riverfront Dr at NB TH 169 Ramps:
    - Maximum WB queues extend 375 ft during the AM peak hour. The intersection of Poplar St and Riverfront Dr is located approximately 200 ft away.
- CSAH 33 at TH 169:
    - Maximum NB queues extend 850 ft during the PM peak hour. Southbend Ave is located approximately 200 ft away.

The existing traffic operations are summarized in **Figure 10** (Appendix A).

2040 No-Build Traffic Conditions

Future traffic volumes for 2040 were developed using a combination of the Mankato/North Mankato Area Planning Organization (MAPO) 2045 Long Range Transportation Plan (LRTP) and historical data from the MnDOT Traffic Mapping Application. See the Traffic Operational Evaluation Memorandum for more information on the forecasting process. **Figure 11** (Appendix A) shows the 2040 peak hour turning movement counts. A level of service (LOS) analysis of the 2040 no build peak hours was completed using the forecasted turning movement counts in Synchro/SimTraffic. The no build operational analysis demonstrates deficiencies that will need to be addressed through system improvements. **Table 8** shows the anticipated 2040 operations with the existing geometry.

Table 8 – 2040 No Build Traffic Operations Analysis Results												
Intersection	A.M. Peak Hour						P.M. Peak Hour					
	Intersection		Maximum Movement				Intersection		Maximum Movement			
	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
Lake St NW (North Access) at TH 169	2	A	EBL	37	E	125	4	A	EBL	81	F	175
Lake St NW (Southern Access) at TH 169	1	A	NBL	10	A	75	1	A	NBL	13	B	75
WB TH 14 Entrance Ramp at TH 169	2	A	NBL	15	B	100	2	A	NBL	18	C	100
EB TH 14 Exit Ramp at TH 169	25	D	EBL	204	F	800	87	F	EBL	926	F	800
EB TH 14 Exit Ramp at TH 14	1	A	NBR	2	C	-	43	E	NBR	297	F	2750
Lind St at TH 169	20	C	NBL	52	D	50	24	C	NBL	51	D	175
River Ln at TH 169	6	A	NBR	10	B	-	7	A	WBR	12	B	275
Webster Ave at TH 169	19	B	SBL	62	E	75	21	C	SBL	61	E	100
Monroe Ave at TH 169	6	A	EBR	18	C	175	5	A	EBR	15	C	125
Belgrade Ave at SB TH 169 Ramps	17	B	SBL	29	C	225	16	B	SBL	39	D	200
Belgrade Ave at NB TH 169 Ramps	4	A	NBL	23	C	75	9	A	NBL	28	C	75
Owatonna St at SB TH 169 Ramps	4	A	NBT	23	C	50	3	A	SBT	3	A	-
Riverfront Dr at SB TH 169 Ramps	26	C	EBT	32	C	450	22	C	EBT	31	C	225
Riverfront Dr at NB TH 169 Ramps	9	A	NBL	46	E	50	8	A	NBL	33	D	50
CSAH 69 (Hawley St) at TH 169	16	C	WBL	129	F	475	2	A	WBL	18	C	75
CSAH 33 at TH 169	5	A	NBL	148	F	100	130	F	NBL	1385	F	4750
TH 68 at TH 169	6	A	SBL	46	E	300	8	A	SBL	70	F	350
CSAH 69 (Gadwall Rd) at TH 169	3	A	SBL	23	C	50	3	A	SBL	36	E	125
CSAH 90 at TH 169	1	A	WBL	6	A	25	1	A	WBL	12	B	75
TH 60 at TH 169	7	A	NBL	57	F	75	25	D	NBL	1200	F	450

*Delay in seconds per vehicle.

The 2040 no build operational analysis indicates that most intersections are anticipated to continue to operate acceptably with delay of LOS C or better except the following intersections which operate with LOS E or F:

- EB TH 14 Exit Ramp at TH 169: Intersection operates with LOS F (PM Peak)
- EB TH 14 Exit Ramp at TH 14: Queues from the EB TH 14 Exit Ramp/TH 169 intersection back up onto TH 14 causing the exit ramp (which should be free flowing) to operate with LOS E (PM Peak)
- CSAH 33 at TH 169: Intersection operates with LOS F (PM Peak)

Additionally, there are several intersections with movements anticipated to operate with LOS E or F during the 2040 peak hours. These include:

- Lake St NW (North Access) at TH 169: EBL operates with LOS E (AM peak); EBL, EBR and WBL operate with LOS F (PM Peak)
- EB TH 14 Exit Ramp at TH 169: EBL operate with LOS F (both peaks); EBR operate with LOS E (AM peak) and LOS F (PM Peak)
- EB TH 14 Exit Ramp at TH 14: NBR operates with LOS F (PM Peak)

- Webster Ave at TH 169: SBL operates with LOS E (both peaks); NBL, EBL and EBT operates with LOS E (PM Peak),
- Riverfront Dr at the NB TH 169 ramps: NBL operate with LOS E (AM Peak)
- CSAH 69 (Hawley St) at TH 169: WBL operates with LOS F (AM Peak)
- CSAH 33 at TH 169: NBL operates with LOS F (both peaks), NBR and WBL operate with LOS F (PM Peak)
- TH 68 at TH 169: SBL operates with LOS E (AM Peak) and LOS F (PM Peak); SBR operates with LOS F (PM Peak)
- CSAH 69 (Gadwall Rd) at TH 169: SBL operates with LOS E (PM Peak)
- TH 60 at TH 169: NBL operates with LOS F (both peaks) and WBL operates with LOS F (PM Peak)

Traffic queuing issues were also identified in the 2040 no build operational analysis. The following queues were found to be problematic:

- <u>EB TH 14 Exit Ramp</u>:
    - Average EB queue extends beyond the left turn lane during both peak hours
    - Maximum EB queue extends onto TH 14 during both the PM peak hours During the PM peak the queue extends 2750 ft beyond the diverge point.
- <u>Lind St</u>:
    - Maximum NBT queue blocks turn lanes during both peak hours
    - Maximum WB queues extend beyond Lind Ct during both peak hours
    - Maximum SBT queue blocks turn lanes the PM peak hour
- <u>Webster Ave:</u>
    - Average EBL/T queues extend beyond Range St (located approximately 175 ft from TH 169) during both peak hours
    - Maximum EBL/T queues extend 350 ft during the AM peak hour and 525 ft during the PM peak hour blocking business driveways.
    - Maximum EBR queue extends to Range St during both peak hours
    - Maximum WBL/T/R queues extend onto River Dr (located approximately 70 ft from TH 169) during both peak hours
- <u>Belgrade Ave at SB TH 169 Ramps:</u>
    - Maximum EBT queue extends past Nicollet Ave (located approximately 125 ft from the intersection) during both peak hours
    - Maximum WBL queue extends beyond the left turn lane during both peak hours
- <u>Riverfront Dr at SB TH 169 Ramps:</u>
    - Maximum EB queue extends beyond the left turn lane during both peak hours

- Maximum WBL queue extends to the Riverfront Dr/NB TH 169 ramp intersection during the PM peak hour
- Maximum SB queues extend past Owatonna St (located approximately 200 ft from Riverfront Dr) during both peak hours, however the queues do not extend onto TH 169.

- Riverfront Dr at NB TH 169 Ramps:
  - Maximum WB queues extend 550 ft during the AM peak hour and 250 ft during the PM peak hour. The intersection of Poplar St and Riverfront Dr is located approximately 200 ft away.
- CSAH 69 (Hawley St):
  - Maximum WBL queue extends beyond the turn lane during the AM peak hour
- CSAH 33:
  - Average NB queue extend over 2000 ft and maximum queues extends nearly one mile during the PM peak hour. This is because only 31% of the traffic can make it through the intersection as there are not adequate gaps in traffic for the northbound left turners to go even with an acceleration lane along WB TH 169.

The 2040 no build traffic operations are summarized in **Figure 12** (Appendix A).

Corridor O/D Assessment

StreetLight Insight was used to analyze origin-destination information for each of the subareas. This information was used to see the main travel patterns and understand what percent of the traffic along Highway 169 is local verses regional.

Each of the subareas were analyzed comparing all vehicle traffic and heavy commercial traffic. A pass-through zone was drawn along each of the TH 169 subareas. Traffic passing through each zone was analyzed for a full 24 hour period. The destinations of all traffic passing through each subarea was analyzed by city and the destinations of heavy commercial traffic passing through each subarea was analyzed by county. The heavy commercial traffic was analyzed by county rather than by city because an initial check of the data indicated that truck traffic was traveling to destinations further away from the project area, where most of the all vehicle trips were local. All of the analysis assumed the zone along TH 169 was the "origin" and the county or city that traffic ended their trip in was considered the "destination". However, by analyzing a full day of trips, the destinations are almost equally the trip origins as a trip leaving home and passing through TH 169 would likely pass through TH 169 on their way home as well. Analyzing the cities and counties as origins was checked in StreetLight. It was found that the percentages were very similar to when they were analyzed as destinations so only the destinations were illustrated.

Figures 13 and **14** (Appendix A) show the results of this analysis. Also, please note that only cities and counties within the state of Minnesota were analyzed as the StreetLight license is limited to Minnesota. An origin-destination analysis completed using zip codes (a preset geometry in StreetLight which analyzes all traffic in state and out of state) indicated that 11-16% of the heavy commercial trips and 2-5% of all vehicle trips were destined for outstate. The analysis discussed below and shown in the figures represents totals for the trips destined for cities and counties in Minnesota (84-89% of heavy commercial trips, 95-98% of all vehicle trips). The southern subarea, which showed the greatest amount of heavy commercial traffic passing through destined for other states, was further analyzed to see which states the 16% of outstate

traffic was destined for. This analysis showed that 8% was destined for Iowa, 6% for South Dakota, 1% for Wisconsin and 1% for other states.

The main trends of the trips destined for Minnesota are summarized below:

- **Northern Subarea:**
  - All Vehicle Traffic – 62% of all traffic passing through are destined for North Mankato and Mankato
  - Heavy Commercial Traffic – 39% of the heavy commercial traffic passing through are destined for Blue Earth County and Nicollet County. Other popular destinations include Nobles County (7%) and Watonwan County (8%)
- **Middle Subarea**:
  - All Vehicle Traffic – 69% of all traffic passing through are destined for North Mankato and Mankato
  - Heavy Commercial Traffic – 37% of the heavy commercial traffic passing through are destined for Blue Earth County and Nicollet County. Other popular destinations include Nobles County (8%) and Watonwan County (10%)
- **Southern Subarea:**
  - All Vehicle Traffic – 43% of all traffic passing through are destined for North Mankato and Mankato
  - Heavy Commercial Traffic – 30% of the heavy commercial traffic passing through are destined for Blue Earth County and Nicollet County. Other popular destinations include Nobles County (9%) and Watonwan County (12%)

This shows that overall traffic patterns are similar throughout the northern and middle subareas, however traffic in the southern subarea shows differing patterns. Far less traffic passing through the southern subarea is destined for North Mankato or Mankato. The heavy commercial data shows similar patterns for all three subareas with 30-39% of traffic destined for Blue Earth County and Nicollet County. Nobles County and Watonwan County were also major destinations for the heavy commercial traffic passing through all three subareas.

A more detailed origin-destination analysis was completed for both all vehicle and heavy commercial traffic throughout the northern and southern subareas. **Figures 15** through **18** (Appendix A) show the results of this analysis. Data was analyzed for the overall day (24 hr total) in addition to the AM and PM peak travel times. Similar results were seen regardless of the time of day analyzed. The main trends of the daily traffic patterns throughout the northern subarea are summarized below.

- **Northern Subarea:**
  - All Vehicle Traffic
    - NB Highway 169 Traffic: Main destinations include Belgrade Ave east of TH 169 (29%), TH 14 east of TH 169 (21%) and TH 169 north of Lake St (22%).
    - SB Highway 169 Traffic: Main destinations include TH 14 east of TH 169 (14%), TH 14 west of TH 169 (14%), Belgrade Ave east of TH 169 (16%), and TH 169 south of Belgrade Ave (35%)
  - Heavy Commercial Traffic
    - NB Highway 169 Traffic: Main destinations include TH 14 east of TH 169 (27%) and TH 169 north of Lake St (45%).

        - SB Highway 169 Traffic: Main destinations include TH 14 east of TH 169 (13%) and TH 169 south of Belgrade Ave (57%)

This analysis indicates that most of the heavy commercial vehicle traffic in the northern subarea remains on the highways. The all vehicle analysis indicates that in addition to TH 169 and TH 14, East Mulberry is a major destination for both northbound and southbound Highway 169 traffic.

The main trends of the daily traffic patterns throughout the southern subarea are summarized below.

- **Southern Subarea:**
    - All Vehicle Traffic
        - NB Highway 169 Traffic: Most traffic remains on Highway 169 throughout the entire subarea (74%). The only other roadways with more than 2% of the traffic include TH 60 west of TH 169 (5%), CSAH 90 (5%), and CSAH 33 (6%).
        - SB Highway 169 Traffic: Main destinations include CSAH 69/Hawley St (19%), CSAH 33 (10%), TH 68 (10%), TH 169 south of TH 60 (9%), and TH 60 west of TH 169 (41%)
    - Heavy Commercial Traffic
        - NB Highway 169 Traffic: Most traffic remains on Highway 169 throughout the entire subarea (76%). The only other roadways with more than 2% of the traffic include TH 60 west of TH 169 (11%), CSAH 90 (3%), and TH 68 (5%).
        - SB Highway 169 Traffic: Most of the traffic ends up along TH 60 west of TH 169 (83%). The only other roadways with more than 2% of the traffic include TH 169 south of TH 60 (6%), TH 68 (3%), and CSAH 69/Hawley St (4%).

This analysis indicates that most of the traffic remains on TH 169 or TH 60 throughout the southern subarea, but the all vehicle analysis showed that CSAH 69/Hawley St and CSAH 33 are also popular destinations for southbound TH 169 traffic in addition to TH 60 and TH 169.

Crash History (2015-2019)

Historic crash data in the study area was analyzed in the Existing Conditions Safety Memorandum (Appendix D) and are summarized on **Figure 19** (Appendix A). This analysis used data obtained from MnDOT for the last five years (2015-2019).

The key results of the crash analysis for the given timeframe include:

- 232 intersection related crashes
- 44 interchange ramp related crashes
- 187 segment crashes
- 4 fatal crashes
    - CSAH 90
    - CSAH 69 (Gadwall Road)
    - Highway 68
    - CSAH 69 (Hawley Street)
- 6 serious injury crashes
- 4 pedestrian and/or bicycle crashes (2010-2019)
- Reviewing the total critical crash rate the following intersections are operating outside the normal range compared to similar intersections statewide:
    - Lind Street at Highway 169
    - Riverfront Drive at NB Highway 169 Ramps
    - Highway 68 at Highway 169

Table 9 provides a crash summary for each intersection. This table details the total crash rate data, not the fatal & serious injury crash rate data. The latest available crash rates are from 2015 and were used for comparison purposes as current statewide average data is unavailable.

Table 9 – Intersection Crash Summary (2015-2019)						
Intersection	**Total Crashes**	**Severe Crashes (K + A)**	**Actual Crash Rate**	**Statewide Average**	**Critical Rate**	**Critical Index**
Lake St NW (North Access) at TH 169	5	0	0.18	0.18	0.41	0.44
Lake St NW (Southern Access) at TH 169	6	0	0.20	0.18	0.40	0.50
Lind St at TH 169	70	1*	1.45	0.45	0.71	2.04
Webster Ave at TH 169	29	0	0.61	0.45	0.71	0.86
Belgrade Ave at NB TH 169 Ramps	21	0	0.50	0.70	1.04	0.48
Belgrade Ave at SB TH 169 Ramps	27	1	0.83	0.70	1.09	0.76
Riverfront Dr at NB TH 169 Ramps	19	0	0.49	0.18	0.37	1.32
Riverfront Dr at SB TH 169 Ramps	11	0	0.35	0.52	0.86	0.41
CSAH 69 (Hawley St) at TH 169	12	1	0.26	0.18	0.36	0.72
CSAH 33 at TH 169	8	1	0.17	0.18	0.36	0.47
TH 68 at TH 169	17	2	0.38	0.18	0.36	1.06
CSAH 69 (Gadwall Rd) at TH 169	2	1	0.06	0.18	0.38	0.16
Loren Dr at TH 169	1	0	0.04	0.18	0.42	0.10
CSAH 69 (Gadwall Rd) West at TH 169	1	0	0.04	0.18	0.41	0.10
TH 60 at TH 169	13	0	0.47	0.25	0.52	0.90

*The serious injury crash at Lind Street was the result of a motorist under the influence and no relation to existing geometry or infrastructure issues.

Table 10 shows the Highway 169 segment crash summary without intersection crashes included. This table details the total crash rate data, not the fatal & serious injury crash rate data.

Table 10 – Segment Crash Summary (2015-2019)*						
Segment	**Total Crashes**	**Severe Crashes (K + A)**	**Actual Crash Rate**	**Statewide Average**	**Critical Rate**	**Critical Index**
Lake St NW to Belgrade Ave	28	1	0.29	0.50	0.69	0.42
Belgrade Ave to the Blue Earth River Crossing	105	0	0.77	0.82	1.02	0.75
Blue Earth River Crossing to Highway 60	58	1	0.31	0.50	0.64	0.48

*Does not include intersection related crashes within each segment

Table 11 shows the segment crash summary with intersection and ramp crashes included. This table also details the total crash rate data, not the fatal & serious injury crash rate data. This shows a crash issue along the middle subarea of the study from Belgrade Avenue to the Blue Earth River Crossing.

Table 11 – Segment Crash Summary (2015-2019)						
Segment	**Total Crashes**	**Severe Crashes (K + A)**	**Actual Crash Rate**	**Statewide Average**	**Critical Rate**	**Critical Index**
Lake St NW to Belgrade Ave	160	2	1.65	1.64	1.98	0.83
Belgrade Ave to the Blue Earth River Crossing	203	1	1.49	1.13	1.37	1.09
Blue Earth River Crossing to Highway 60	116	7	0.61	1.64	1.88	0.32

Table 11 shows that the middle subarea operates with a critical index of 1.09 which indicates that the segment operates outside the normal range. Although the total crash critical index is less than one along the southern subarea from the Blue Earth River Crossing to Highway 60, with seven severe crashes in the last 5 years, this segment has a fatal & serious injury critical index of 1.03. This indicates that the segment is operating above the normal range for fatal and serious injury crashes compared to similar roadway segments statewide.

Interchange Crash Summary

Crashes at the Highway 14, Lookout Drive and CSAH 90 interchanges were also analyzed. Since crashes at the ramps and merge areas are not considered intersection or segment crashes, these crashes were analyzed separately and are summarized below.

Highway 14 at Highway 169

- 21 crashes
- No severe crashes

Belgrade Ave at Highway 169

- 3 crashes
- No severe crashes

Lookout Drive at Highway 169

- 19 crashes
- No severe crashes

Riverfront Drive at Highway 169

- 11 crashes
- No severe crashes

CSAH 90 at Highway 169

- 4 crashes
- 1 fatal crash involving a motorcycle merging onto NB Highway 169 from WB CSAH 90 that hit a semi-truck

For details on the crash analysis including crash trends and predominate crash types please see Appendix D.

Access

Highway 169 is defined as a Category 2 – Medium Priority Interregional Corridor throughout the study area according to the Minnesota Department of Transportation (MnDOT) Access Management Manual. Category 2 corridors connect secondary regional trade centers to primary regional trade centers and provide both interstate and intrastate travel. Access management emphasizes mobility on Category 2 highways.

The subcategory however changes throughout the project area. **Table 12** below shows the subcategory limits along Highway 169.

Table 12. Access Management Subcategory Limits

Limits	Subcategory
Lake St (north) to Lind St	A - Rural
Lind St to Belgrade Ave	B - Urban/Urbanizing
Belgrade Ave to CSAH 69 (Hawley St)	AF - Non-Interstate Freeway
CSAH 69 (Hawley St) to Highway 60	A - Rural

The recommended spacing for primary and secondary intersections varies based on the subcategory. A primary intersection refers to a junction between two major roads and a secondary access refers to a junction between a major road and a minor road or local street. **Tables 13** and **14** below show the spacing between primary and secondary intersections along Highway 169 throughout the project limits. Interim spacing requirements for a Category AF roadway in transition does not specifically recommend secondary intersection spacing so these intersections were evaluated using a spacing of ½ mile. When measuring between interchanges, the spacing was measured from the ramp gore.

Table 13. Spacing Between Primary Intersections

Subcategory	Primary Intersections	Miles	Spacing Recommendation (Miles)	Meets Spacing Recommendation
A/B Mix	Highway 14 to Webster Ave	0.64	0.5	Yes
B	Webster Ave to Belgrade Ave	0.60	0.5	Yes
AF	Belgrade Ave to Lookout Dr	0.09	1	No
	Lookout Dr to Riverfront Dr	0.13	1	No
	Riverfront Dr to CSAH 69 (Hawley St)	0.74	1	No
A	CSAH 69 (Hawley St) to CSAH 33	0.57	1	No
	CSAH 33 to Highway 68	0.68	1	No
	Highway 68 to CSAH 90	1.2	1	Yes
	CSAH 90 to Highway 60	1.4	1	Yes

Table 14. Spacing Between Secondary Intersections

Subcategory	Secondary Intersection	Miles	Spacing Recommendation (Miles)	Meets Spacing Recommendation
A	Lake St (North) to Lake St (South)	0.02	0.5	No
	Lake St (South) to Highway 14	0.16	0.5	No
	Highway 14 to Lind St	0.08	0.5	No
B	Lind St to River Ln	0.14	0.25	No
	River Ln to Webster Ave	0.44	0.25	Yes
	Webster Ave to Monroe Ave	0.45	0.25	Yes
	Monroe Ave to Belgrade Ave	0.15	0.25	No
AF	Riverfront Dr to Woodland Ave	0.42	0.5	No
	Woodland Ave to CSAH 69 (Hawley St)	0.32	0.5	No
A	CSAH 69 (Hawley St) to Amos Owen Ln	0.19	0.5	No
	Amos Owen Ln to CSAH 33	0.38	0.5	No
	CSAH 33 to Bison St	0.50	0.5	Yes
	Bison St to Highway 68	0.18	0.5	No
	Highway 68 to 211th Ln	0.32	0.5	No
	211th Ln to CSAH 69 (Gadwall Rd)	0.14	0.5	No
	CSAH 69 (Gadwall Rd) to CSAH 120	0.47	0.5	No
	CSAH 120 to CSAH 90	0.26	0.5	No
	CSAH 90 to CSAH 117	0.10	0.5	No
	CSAH 117 to Loren Dr	1.02	0.5	Yes
	Loren Dr to CSAH 69 (Gadwall Rd)	0.14	0.5	No
	CSAH 69 (Gadwall Rd) to Highway 60	0.14	0.5	No

Table 14 shows that only 4 of the 9 distances between primary intersections along Highway 169 meet the recommended spacing and only 4 of the 21 distances between secondary intersections meet the recommended spacing. 211th Lane and Loren Drive are technically local roadways which only serve a few businesses and therefore could be classified as driveways; however, they were analyzed as a secondary access as they both provide full access to Highway 169. All field entrances are served by the adjacent roadway network. None have direct access onto Highway 169. The primary and secondary intersection are shown in **Figure 20** (Appendix A).

Pedestrian and Bicycle Connections

The Highway 169 study area includes existing regional and local trail connections throughout. The primary continuous north-south trail connections align both sides of the Minnesota River. Existing and planned pedestrian and bicycle connection in the study area are shown in **Figure 12.** The following summarizes bicycle and pedestrian facilities and needs within the study area.

On the east side of the river, the Rex Macbeth River Trail follows Highway 169 from the Kiwanis Recreation Area north of the Highway 169/14 interchange to the Veterans Memorial Bridge. On the west side of the river, the Minnesota River Trail follows Highway 169 from the Highway 14 trail and the Highway 169/14 interchange to the Northstar Bridge. The Northstar Bridge Trail runs adjacent to Highway 169 from Lookout Drive to S Riverfront Drive. The West Mankato Trail connects to the Minnesota River Trail and runs south through West Mankato. Farther south along the study area, the Minneopa Trail runs adjacent to the west side of Highway 169 from Woodland Avenue, across the Blue Earth River, and to Highway 68 for connection to and within the Minneopa State Park.

Several of the trails along Highway 169 demand safe crossings across the Highway and currently not all crossings are ADA compliant. This is the case at Lind Street, Webster Avenue, Riverfront Drive, CSAH 69, and Highway 14. Below summarizes existing gaps and safety concerns in the pedestrian and bicycle network along Highway 169:

- Connection from the Highway 14 trail on the west side of Highway 169 to the east near Lind Street for access to the Minnesota River Trail.
- Pedestrian crossing demand exists at the CSAH 69/Hawley Street intersection due to the need to connect the residential areas both north and south of the highway to the Quick Mart and to the Minneopa Trail for access across the Blue Earth River bridge. The trail on this bridge is the only access point by bike or foot into West Mankato destinations such as Roosevelt Elementary School, West High School, Cub Foods, and other commercial businesses and employment in downtown Mankato. A striped crosswalk was removed from this location due to safety concerns; a legal crossing with ramps is still present, however pedestrians are required to yield to traffic on Highway 169. Demand still exists for this crossing and often includes children and young adults.

Figure 21 (Appendix A) also includes planned bike and pedestrian trails. The planned trail along Poplar Street will connect the West Mankato Trail to important destinations such as downtown Mankato.

Transit

City of Mankato Transit serves the cities of Mankato, North Mankato, Eagle Lake, and parts of South Bend Township. **Figure 22** (Appendix A) depicts transit routes that intersect the Highway 169 corridor. These routes run every 30-60 minutes depending on route every Monday through Friday from 6:30 AM to 5:30 PM or 10:00 AM to 10 PM (Route 7 only). Youth, age zero through high school student, may ride all City of Mankato buses at no cost. For those living outside fixed-route bus lines, Mankato bus service offers the Kato Flex, a free, curb-to-curb service for residents living in Sibley, Germania, Tourtellotte, Skyline, Eagle Lake, West Mankato, and LeHillier in South Bend. This service provides residents with transportation

anywhere Mankato bus service is provided at no cost for others living in the areas listed above. Kato Flex runs from 6 AM to 6 PM, Monday through Friday. All buses are ADA accessible and equipped with bike racks.

Route 5, primarily serving North Mankato intersects with Highway 169 and crosses the Minnesota River at the Belgrade Avenue and Lookout Drive interchanges to connect Downtown North Mankato through its residential areas and into to downtown Mankato. From there, routes 2, 3, 7, 10, 11, 12, and 13 connect to destinations around the MAPO area such as Minnesota State University, Mankato, Mankato Public Schools, Blue Earth County Library, and many commercial destinations offering daily service needs.

Summary of Issues

Appendix E contains an Issues Identification infographic highlighting the summary of issues below.

- *Existing Capacity Needs:* All intersections overall operate acceptably with LOS C or better. There are several intersections however with movement or two that operate with LOS E or F during the peak hours. These include: Lake St NW (North Access) at TH 169, EB TH 14 Exit Ramp at TH 169, Webster Ave at TH 169, CSAH 33 at TH 169, and TH 60 at TH 169. Additionally, the following intersections along Highway 169 have problematic queuing issues during the peak hours: Lind St, Webster Ave, Belgrade Ave at the SB TH 169 ramps, Riverfront Dr at the SB TH 169 ramps, Riverfront Dr at the NB TH 169 ramps, and CSAH 33 at TH 169**.**
- *Future Capacity Needs:* The 2040 no build analysis showed that two intersections are anticipated to operate with excessive delay during the peak hours if improvements are not made. These intersections include: EB TH 14 Exit Ramp at TH 169 and CSAH 33 at TH 169. Additionally, problematic queuing is anticipated at the following intersections during the 2040 peak hours: EB TH 14 Exit Ramp, Lind St, Webster Ave, Belgrade Ave at the SB TH 169 ramps, Riverfront Dr at the SB TH 169 ramps, Riverfront Dr at the NB TH 169 ramps, CSAH 69 (Hawley St), and CSAH 33**.**
- *Access Spacing*. Several primary and secondary intersections along Highway 169 do not meet recommended spacing.
- *Safety***:** The intersections of Lind Street, Belgrade Avenue at SB Highway 169 Ramps, Riverfront Drive at NB Ramps, Highway 68, CSAH 69 (Hawley St) are operating outside the normal range compared to similar intersections. Highway 169 from Belgrade Avenue to Highway 60 has a segment crash rate outside the statewide average for similar corridors.
- *System Linkages***:** Highway 169 is a principal arterial, NHS route, and major freight corridor providing a north-south connection between Minneapolis-St. Paul, Mankato/North Mankato, and into southern Minnesota. Highway 169 also provides an important regional connection to US Highway 14. The Mankato/North Mankato area has experienced widespread growth across the metropolitan area and serves southern Minnesota as a hub for health care, education, retail, agriculture, and industry.
- *Local Connectivity & Accessibility***:** Highway 169 provides important local connections passing through the Cities of Mankato and North Mankato. The corridor serves as the point of entry to both Downtowns in Mankato and North Mankato as well as to Minnesota State University Mankato. Highway 169 also provides important local connections to major industrial areas and highway commercial in Mankato, North Mankato, and South Bend Township. Overall, local residential, commercial, industrial, institutional, and recreational uses depend on local connectivity and accessibility to the highway.

- *Consistency with State and Local Plans*: Many previous plans and studies have been completed for the study's system corridors, in which many areas of concern were identified along Highway 169 with crash issues including; at the Highway 14 interchange, Lind Street intersection, and the corridor segment from the Highway 14 south ramp to Webster Street. Previous efforts include five design concepts for the Highway 169 and Highway 14 interchange. Planned projects by MnDOT and the City of Mankato have also resulted. Proposed improvements include roadway expansion, ramp intersection reconfiguration, pavement preservation, pedestrian oriented safety improvements, trail extensions, and transit travel time and reliability solutions. Some of these projects have been programmed for implementation or are soon starting design. All planned and programmed projects will need to be considered in the development of concept alternatives through this effort.

  Previous planning efforts have identified major population growth and some development/redevelopment along the Highway 169 corridor (i.e. Riverside North Redevelopment in Mankato and Webster Avenue in North Mankato). Population growth coupled with additional commercial, industrial, and residential uses may increase traffic volumes and safety concerns.

  Both the City of Mankato and City of North Mankato passed resolutions stipulating their consent to the Corridor Study in July 2019. Both resolutions are included in the previous studies section of this report, Appendix A, and as an attachment to the Project Management Plan.

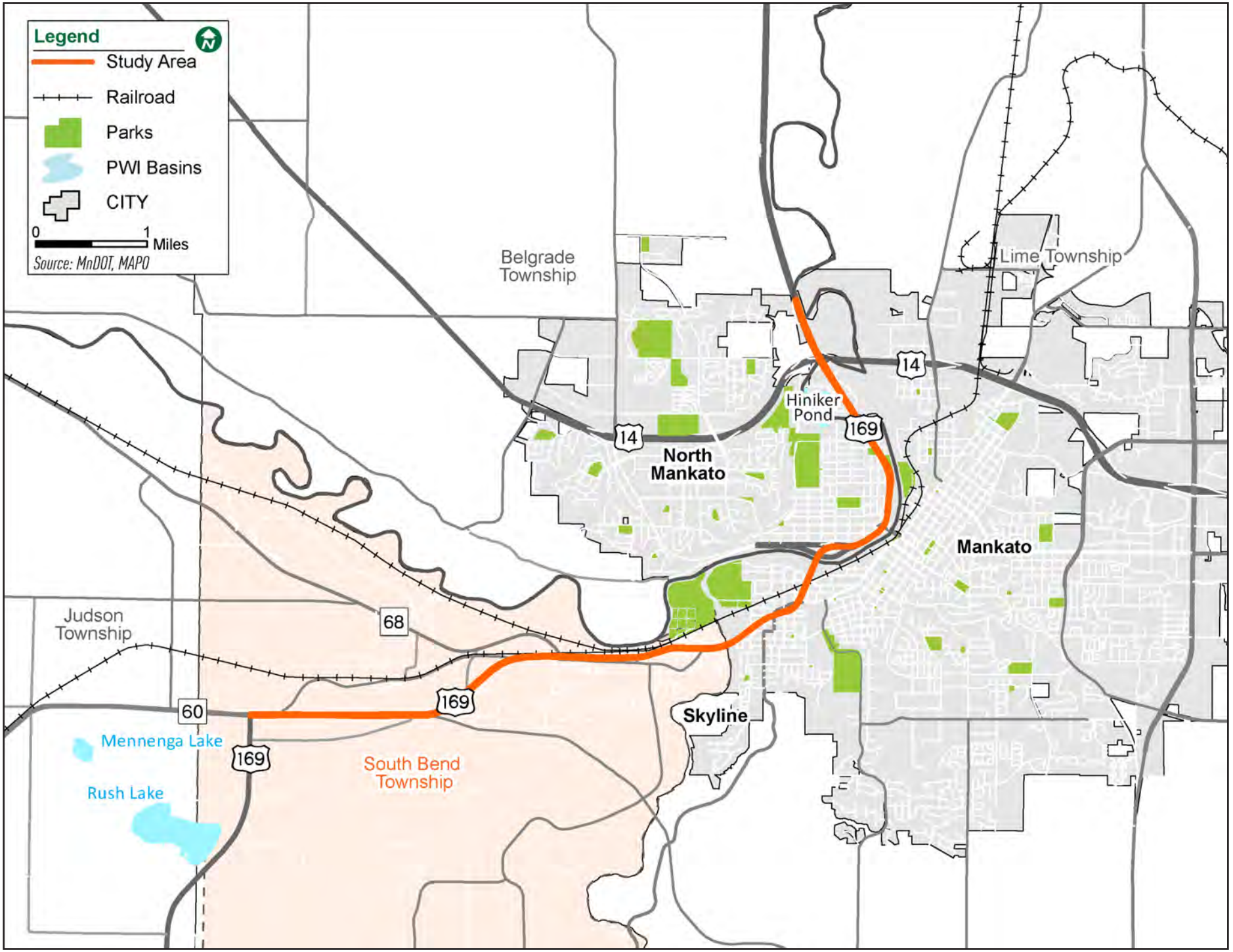
  The City of North Mankato's Comprehensive Plan includes a policy related to Highway 169 listed in the Transportation System Goals, Objectives, and Policies, that states that full access conditions must be maintained at the Webster Avenue/Highway 14 intersection

- *Modal Interrelationships:* The planning area is served by several regional trail connections including the Rex Macbeth River Trail, Minnesota River Trail, West Mankato Trail, Northstar Bridge Trail, and the Minneopa Trail. These trails provide pedestrian and bicycle connections along Highway 169. There are a few gaps that remain including crossing accommodations for pedestrians and bicyclists at Lind Street.

  The area is serviced by the City of Mankato Transit with a few routes intersecting Highway 169 but none currently using the highway corridor.

- *Environmental Considerations:* There are some social, economic, and environmental (SEE) resources in proximity to the planning area that need to be considered that include environmental justice populations, several potentially contaminated sites, scattered stands of trees, grassy areas, lakes, streams, rivers, ponds, and wetlands. Any wildlife displaced by any projects or construction resulting from the completion of this study will likely relocate to suitable nearby areas, including lands immediately adjacent to the project area. A FEMA controlled levee exists along the corridor on the river side of Highway 169 to minimize flooding associated with high water levels in the Minnesota River. The levee is a combination of earthen berm and concrete floodwall that provides flood protection for North Mankato, Mankato, and LeHillier when the River is at flood stage.

Existing & No-Build Conditions Appendix A: Study Area Figures and City Resolutions


Legend
Study Area
Railroad
Parks
PWI Basins
CITY
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Miles
Source: MnDOT, MAPO
Belgrade Township
Lime Township
Hiniker Pond
14
169
North Mankato
Mankato
Judson Township
68
60
169
Skyline
Mennenga Lake
Rush Lake
South Bend Township

Figure 4 - Subarea 1 - FUNCTIONAL CLASSIFICATION

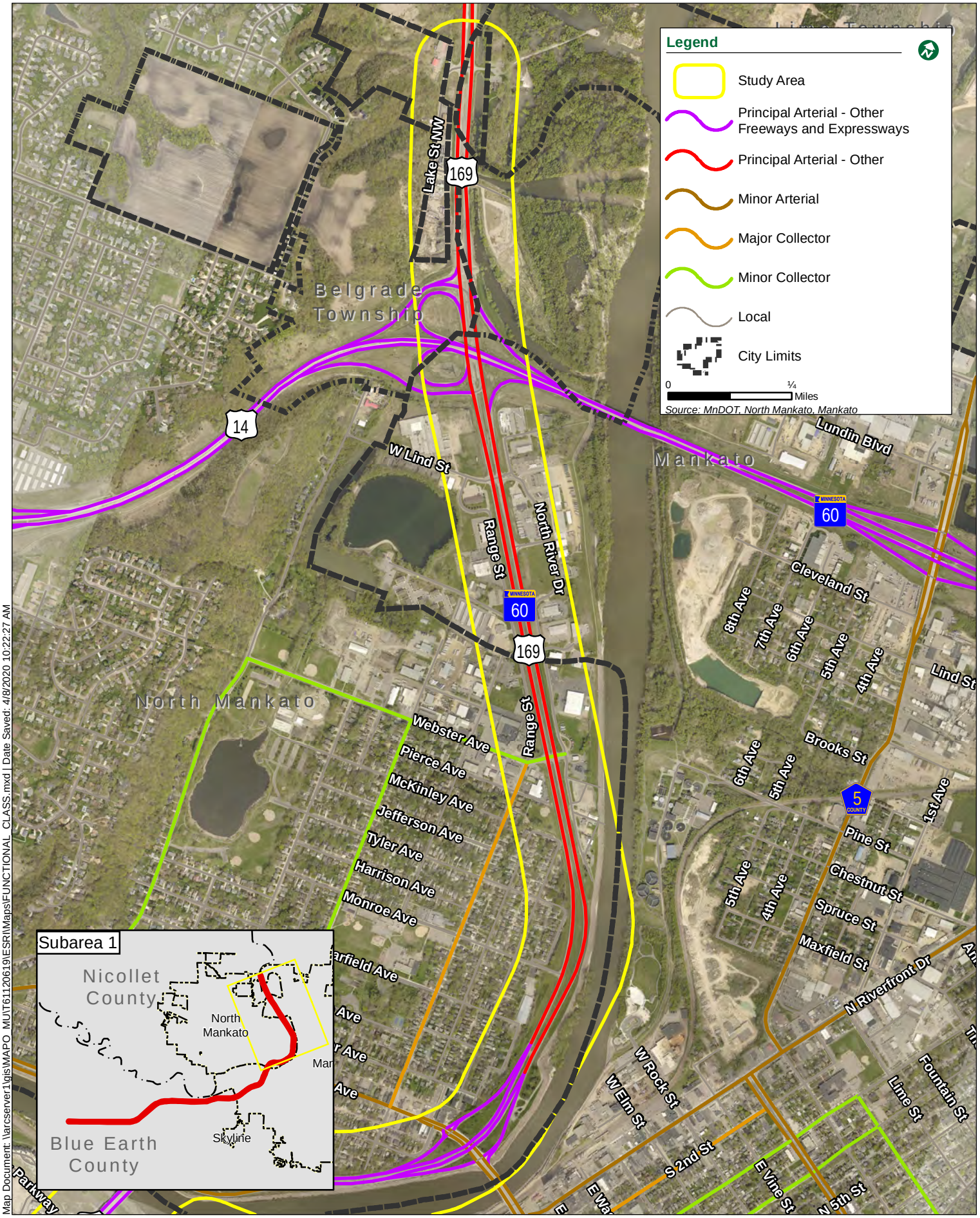

Figure 4 - Subarea 2 - FUNCTIONAL CLASSIFICATION

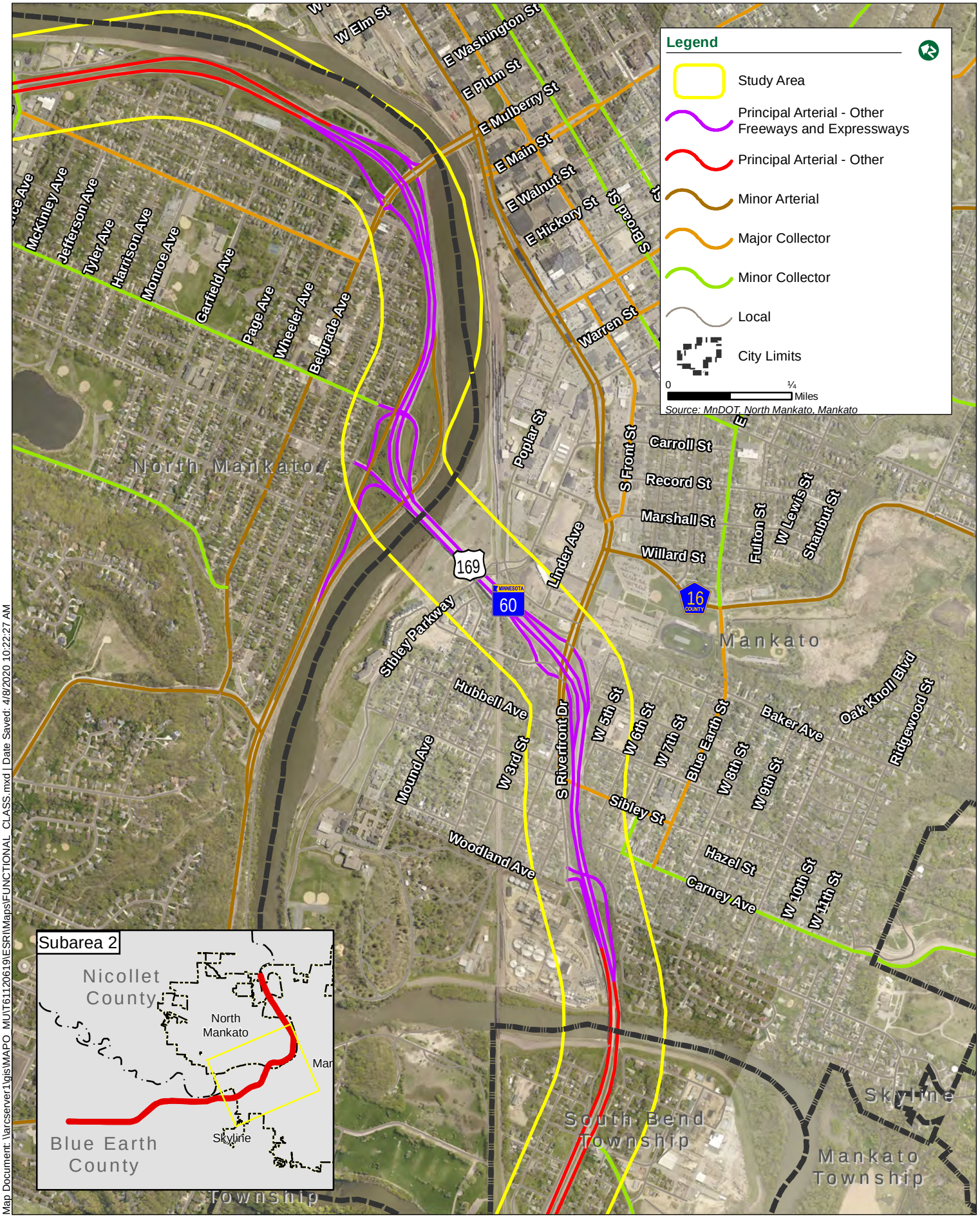

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Figure 4 - Subarea 3 - FUNCTIONAL CLASSIFICATION

April 2020

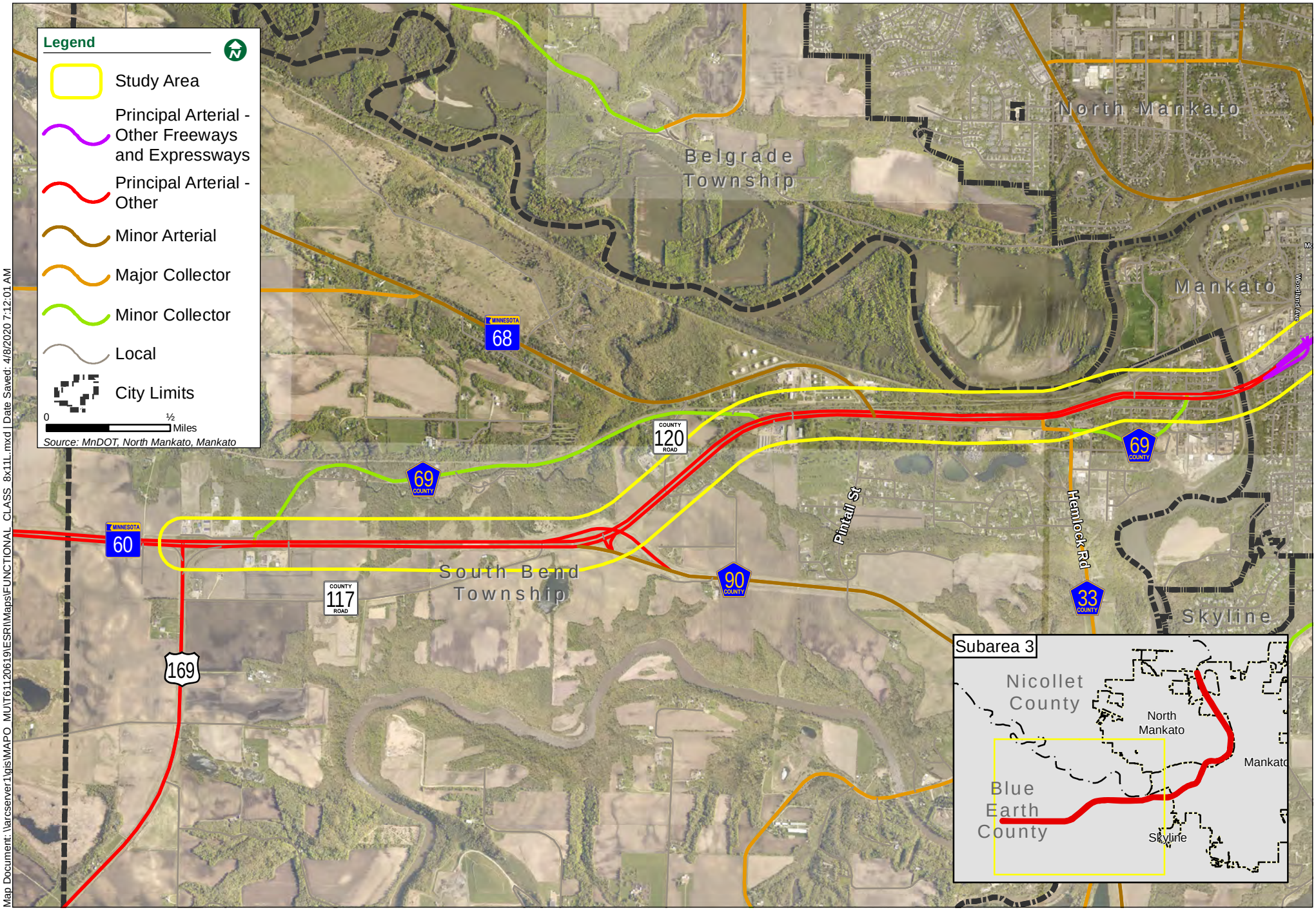

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Figure 5 - Subarea 1 - ROADWAY JURISDICTION

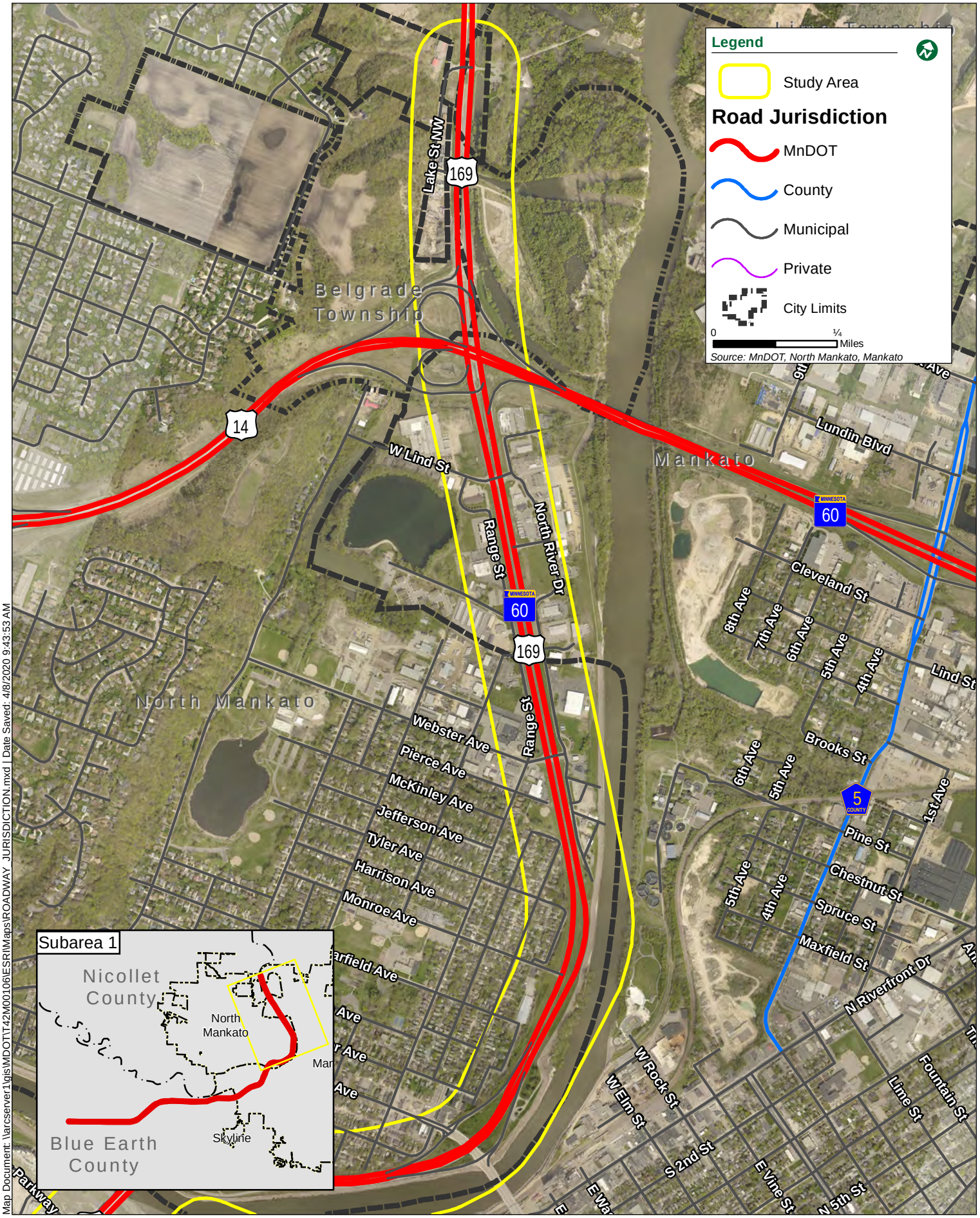

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Figure 5 - Subarea 2 - ROADWAY JURISDICTION

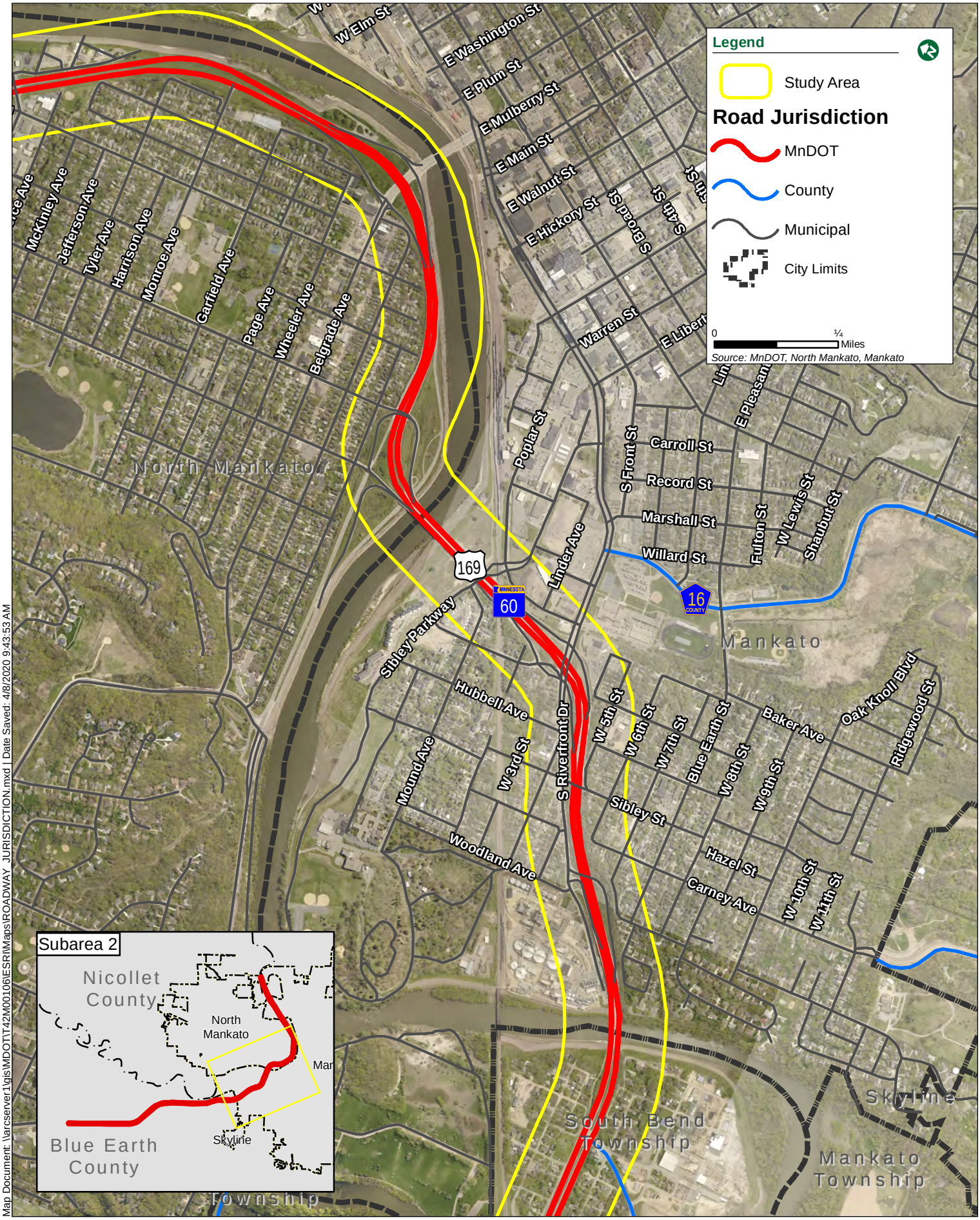

Figure 5 - Subarea 3 - ROADWAY JURISDICTION

April 2020

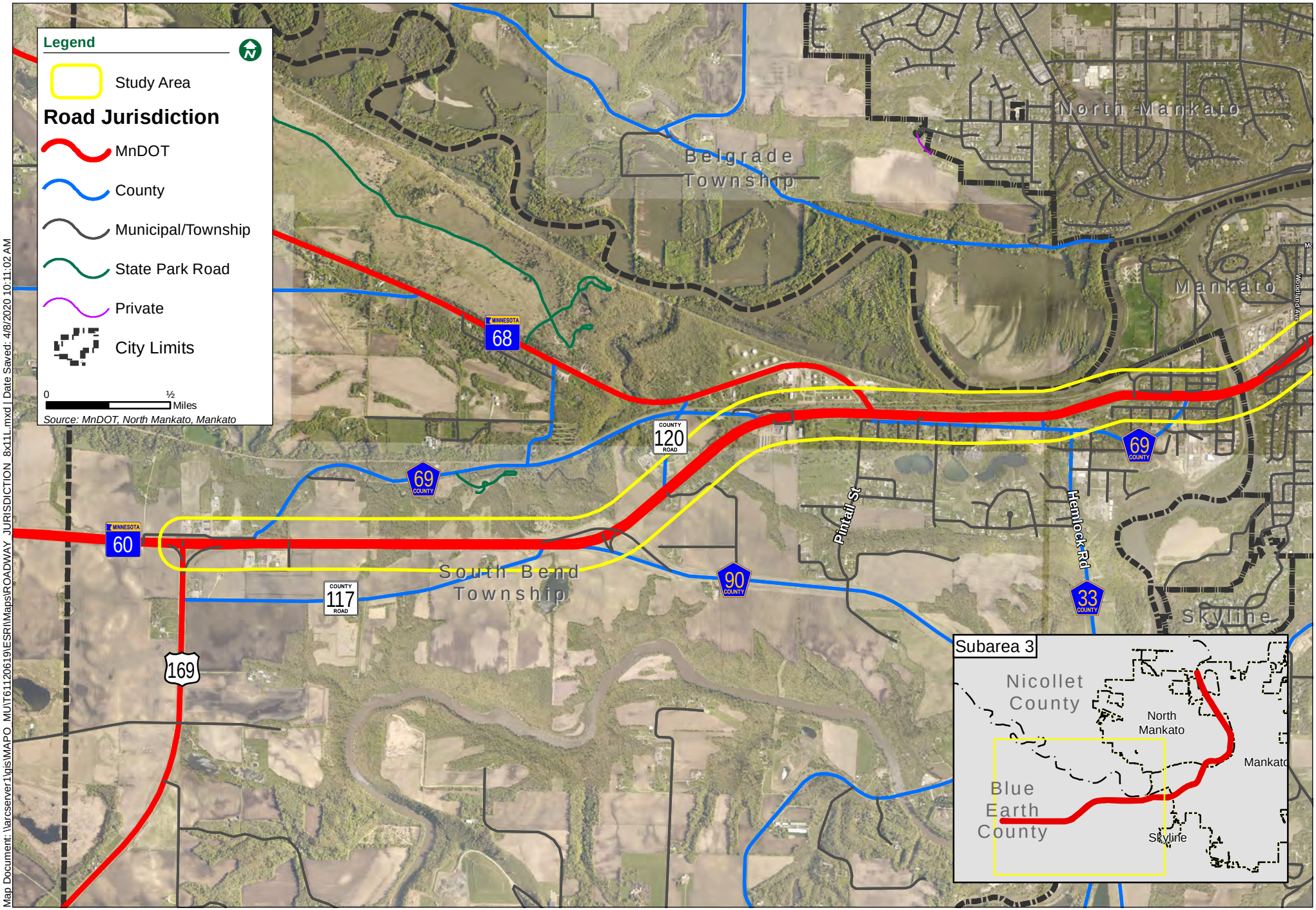

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Figure 6 - Subarea 1 - EXISTING LAND USE

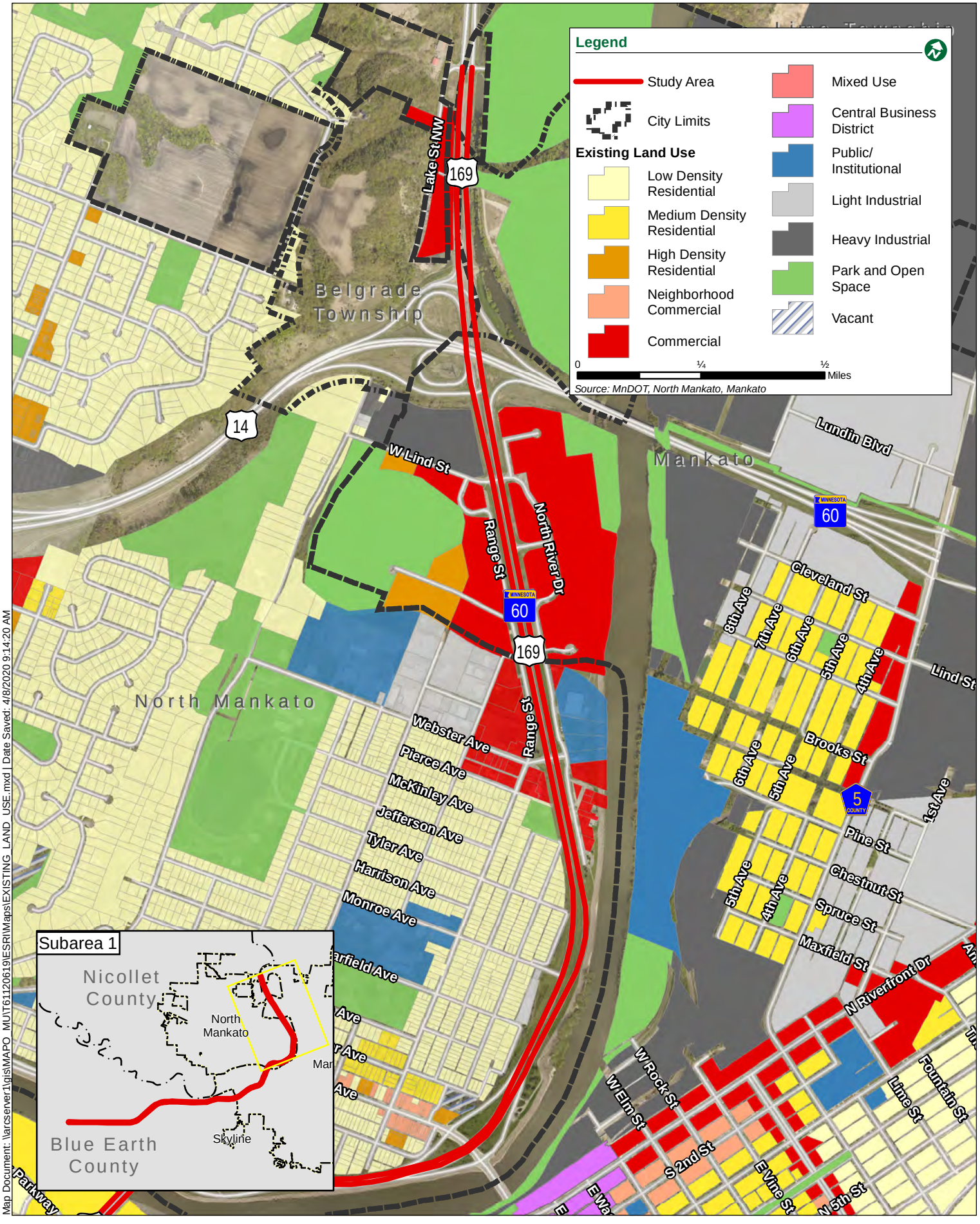

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Figure 6 - Subarea 2 - EXISTING LAND USE

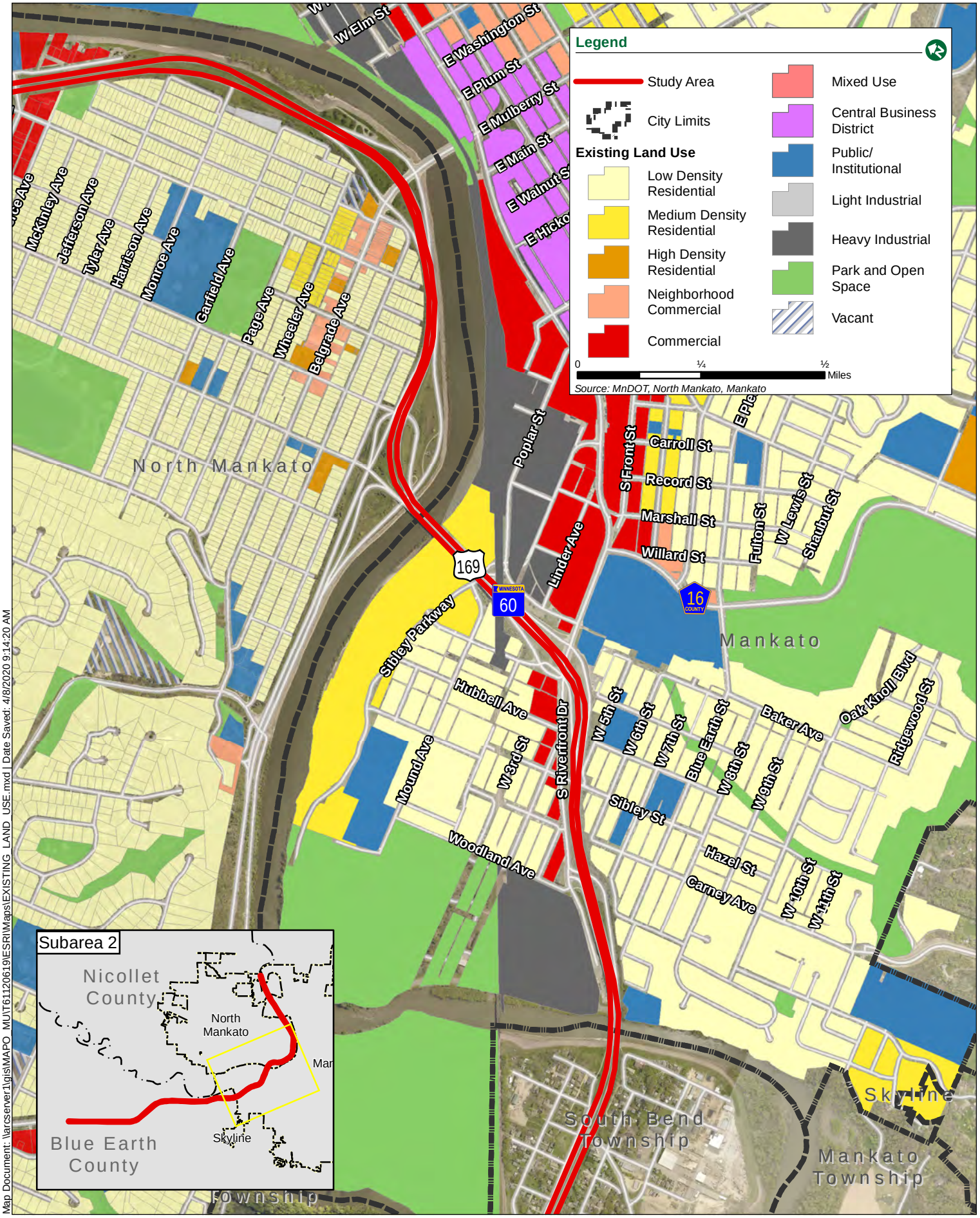
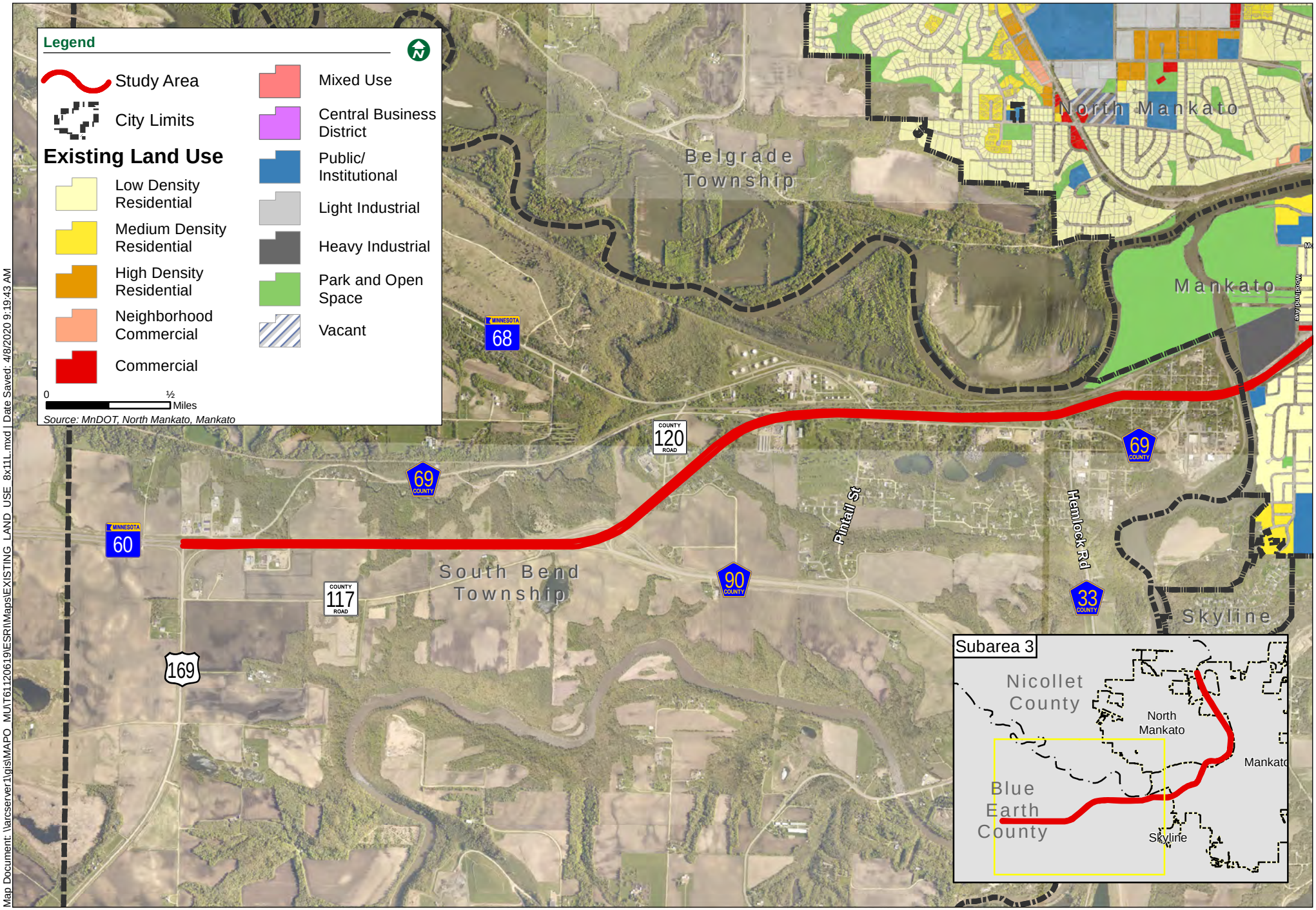


Figure 6 - Subarea 3 - EXISTING LAND USE

April 2020



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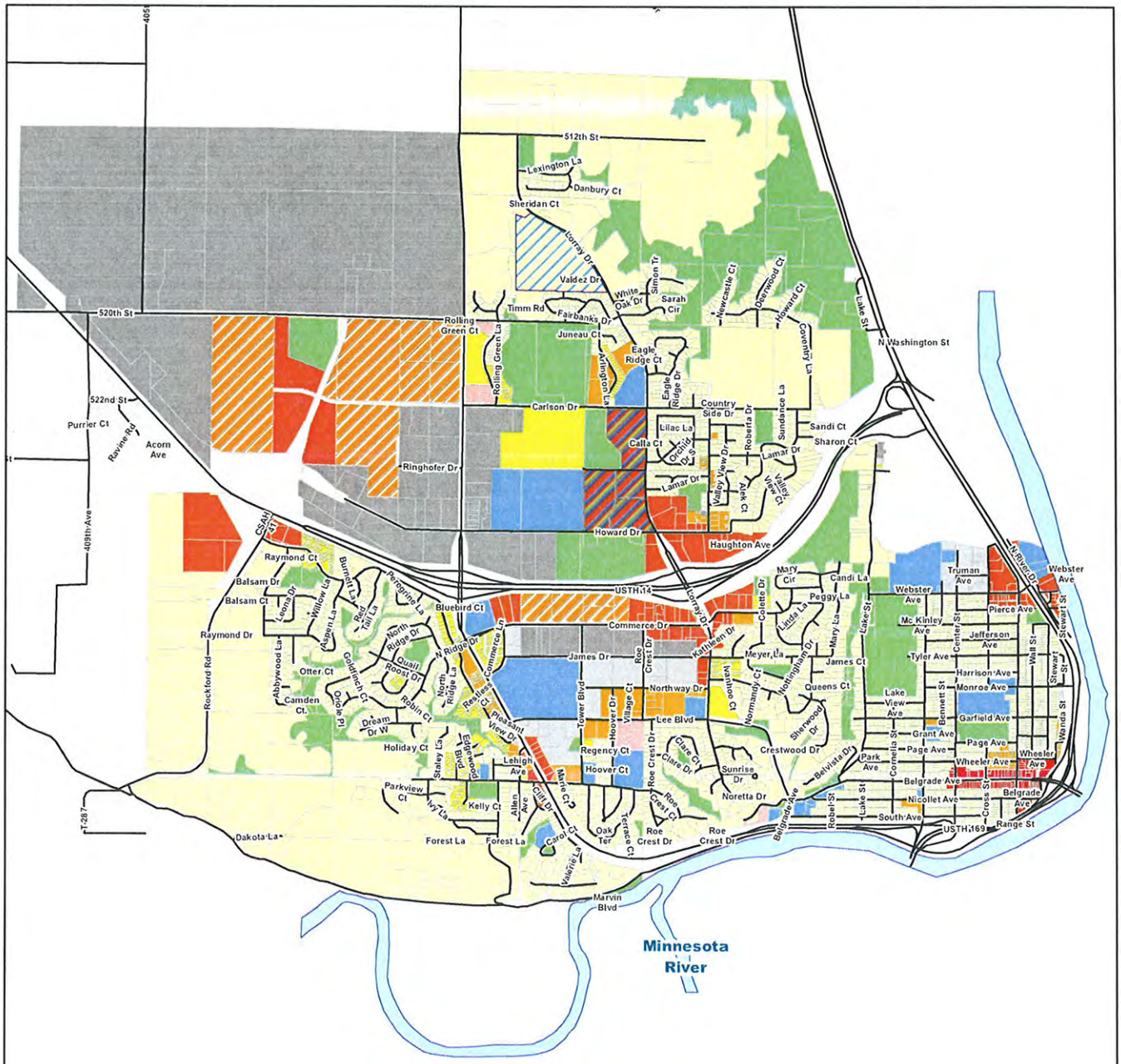

Figure 3-2: Future Land Use
North Mankato Comprehensive Plan

Figure 7 - **Land Use Plan**

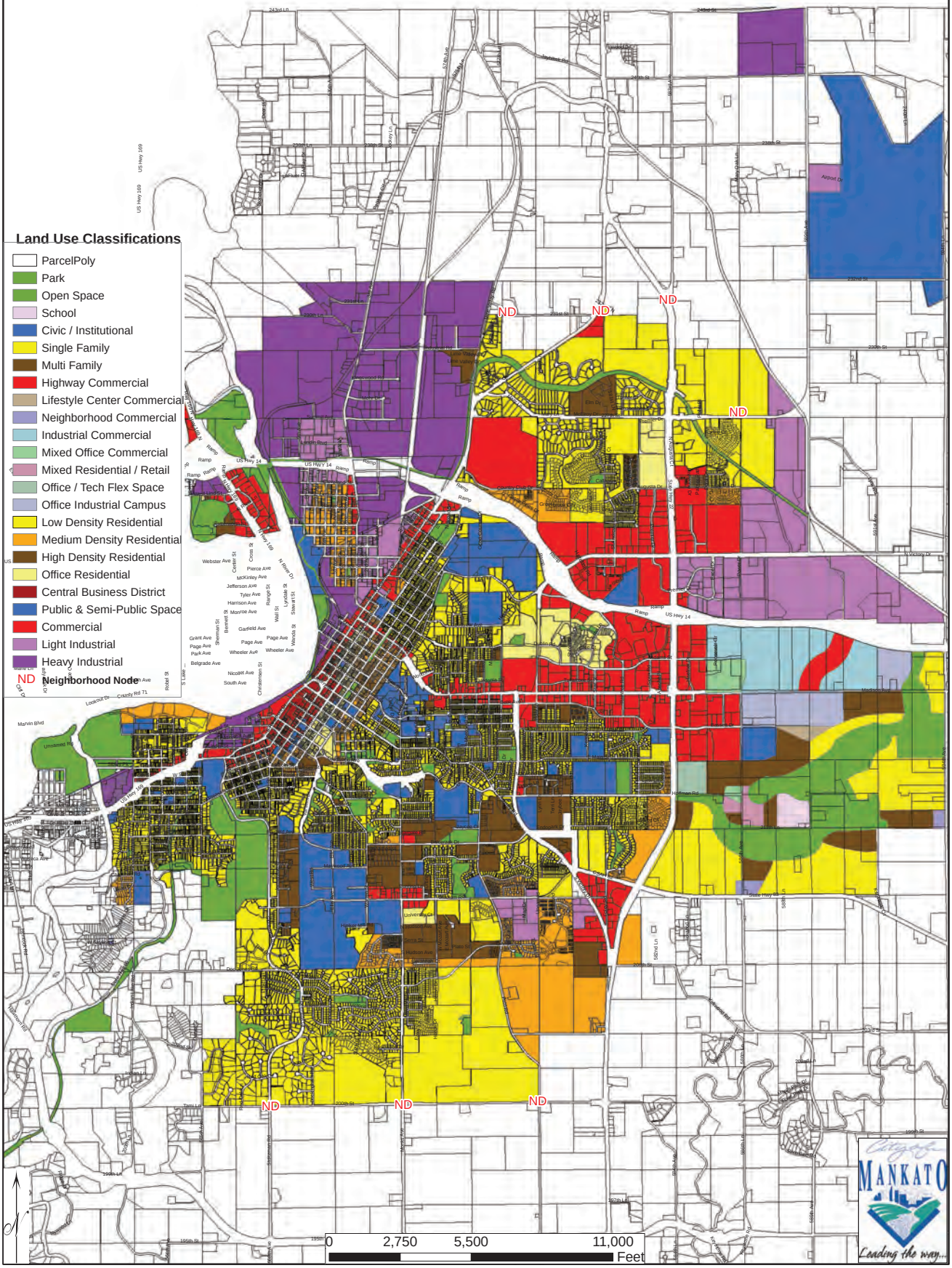

Figure 9A Subarea 1 Existing Turning Movement Counts

June 2020

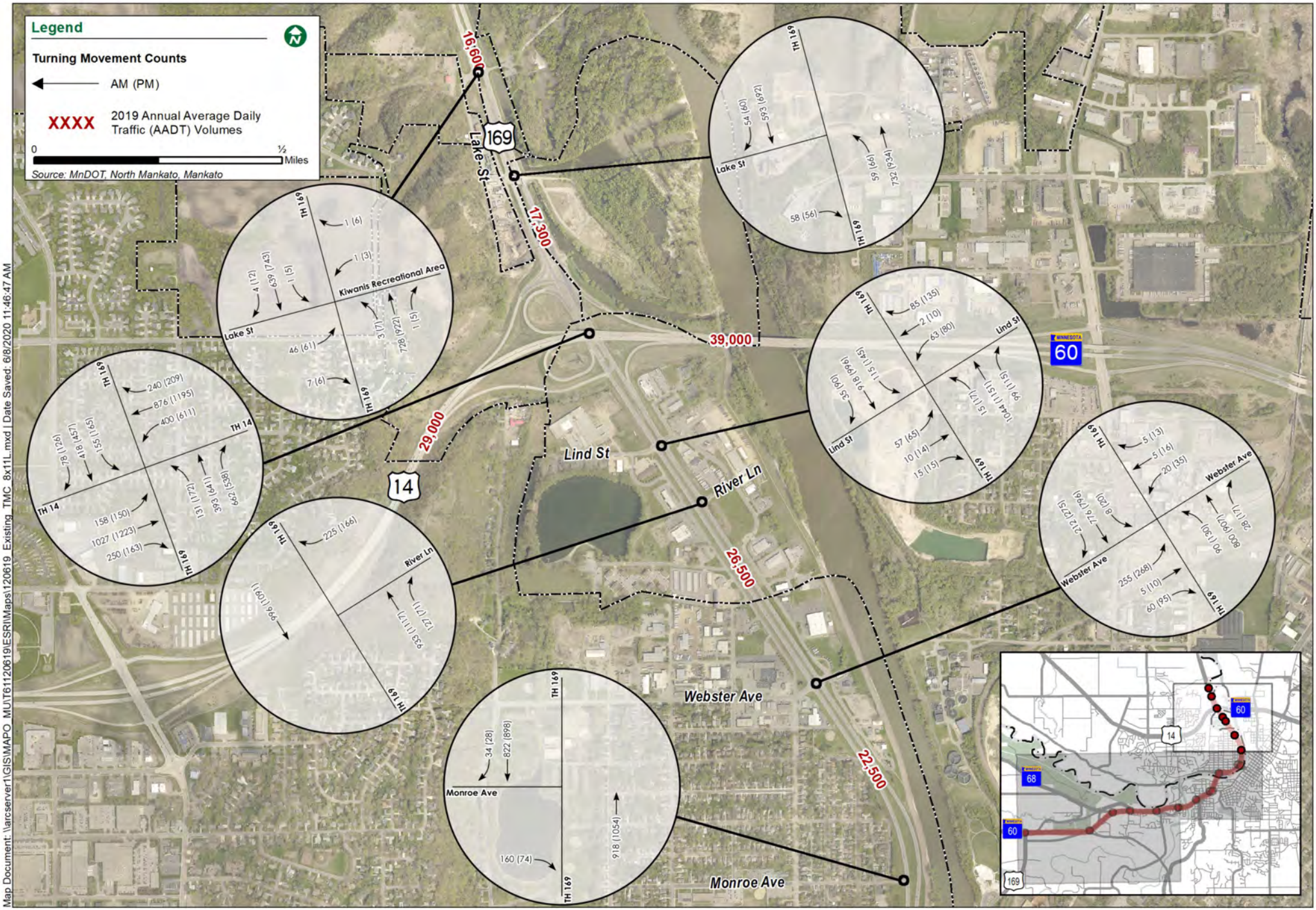

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Figure 9A Subarea 2 Existing Turning Movement Counts

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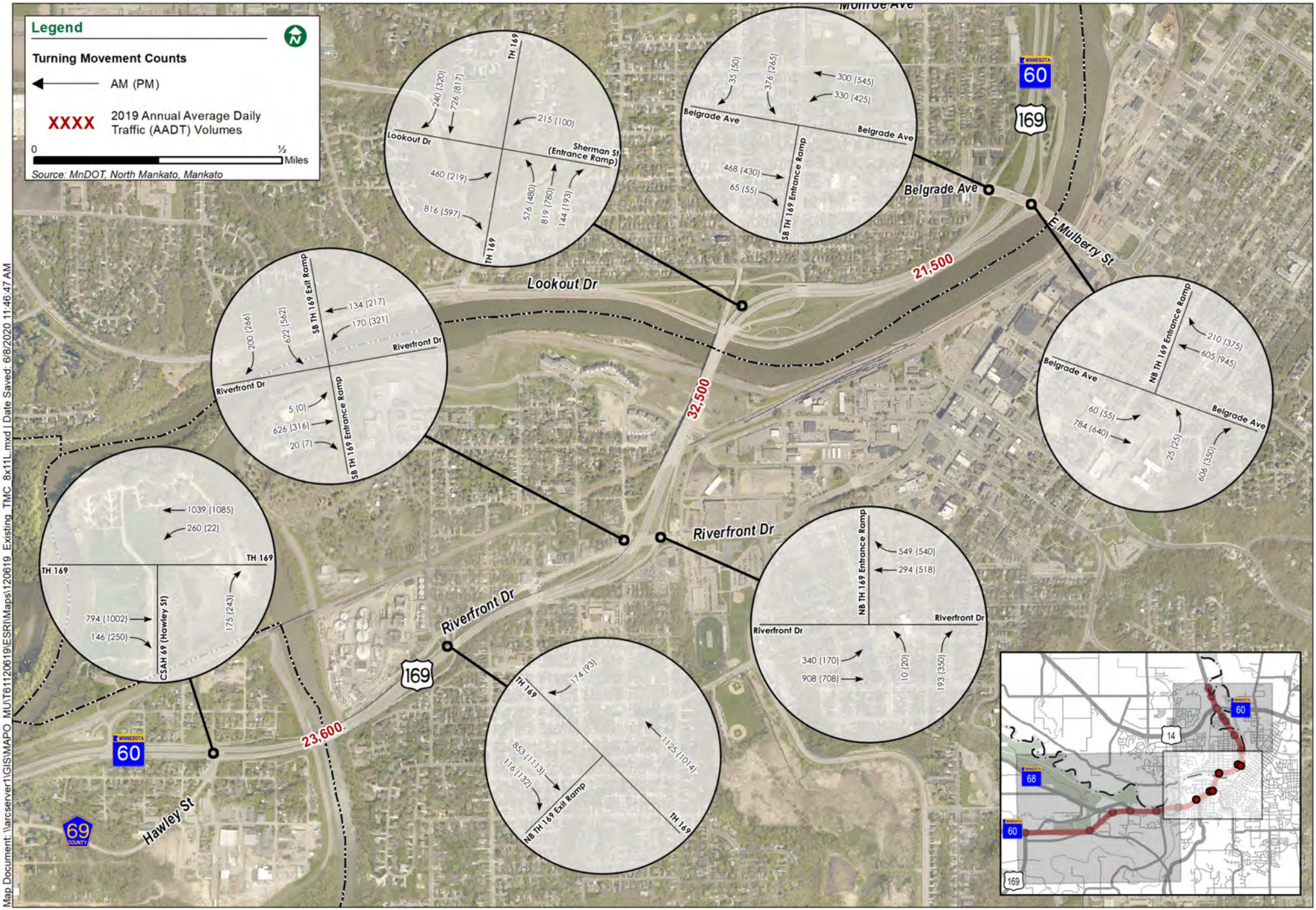

Figure 9A Subarea 3 Existing Turning Movement Counts

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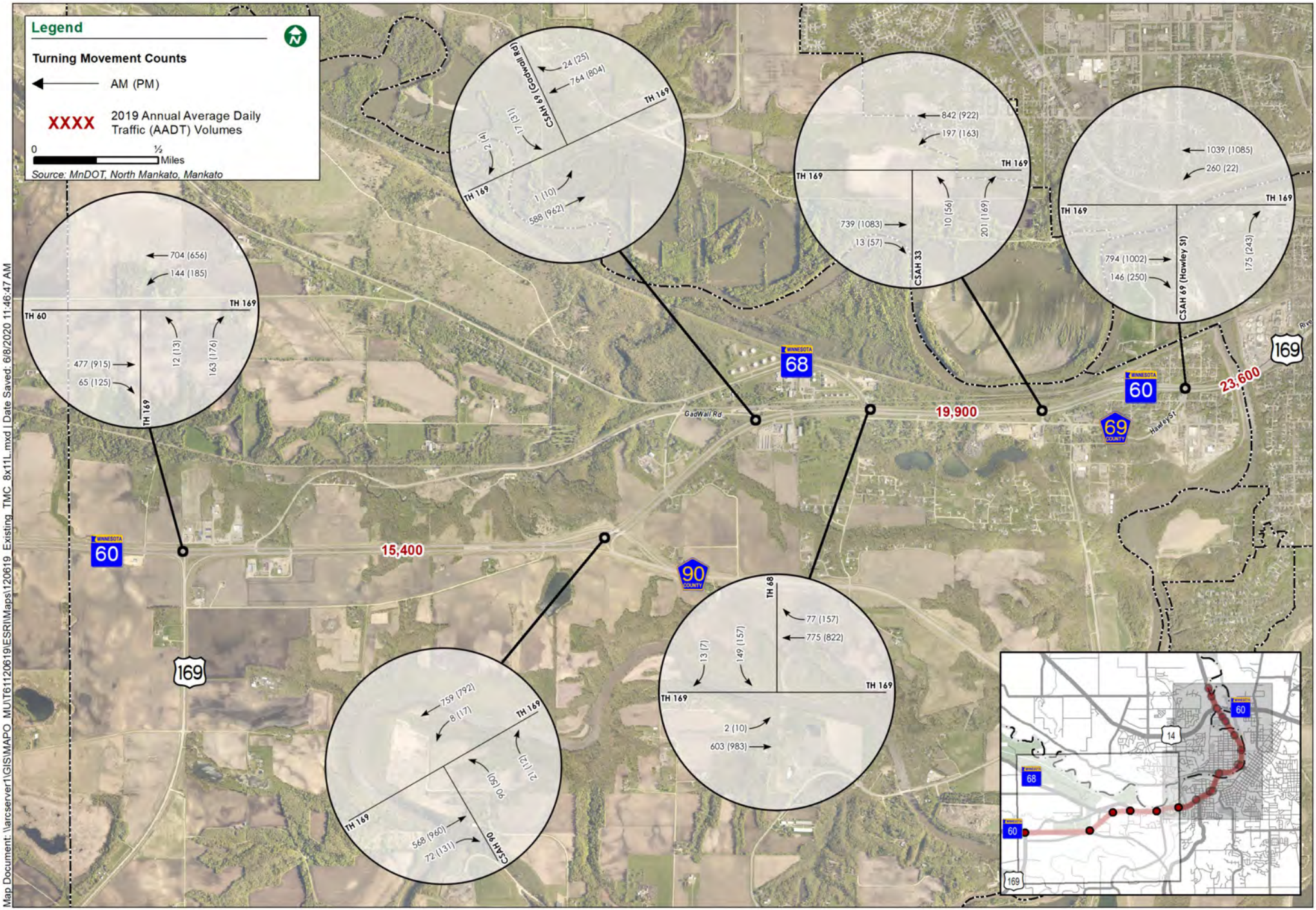

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Figure 9B Subarea 1 PreviousTurning Movement Counts

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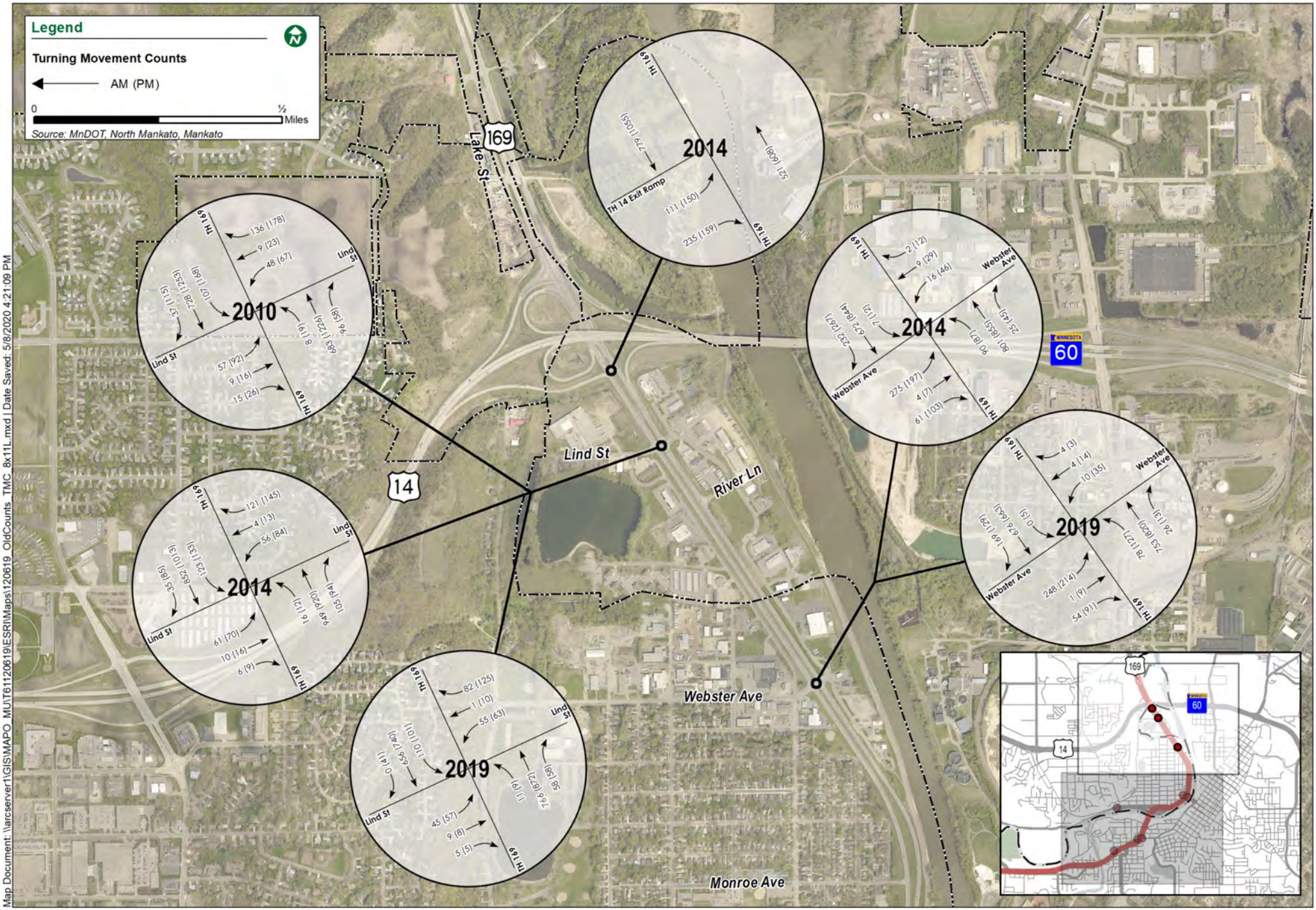

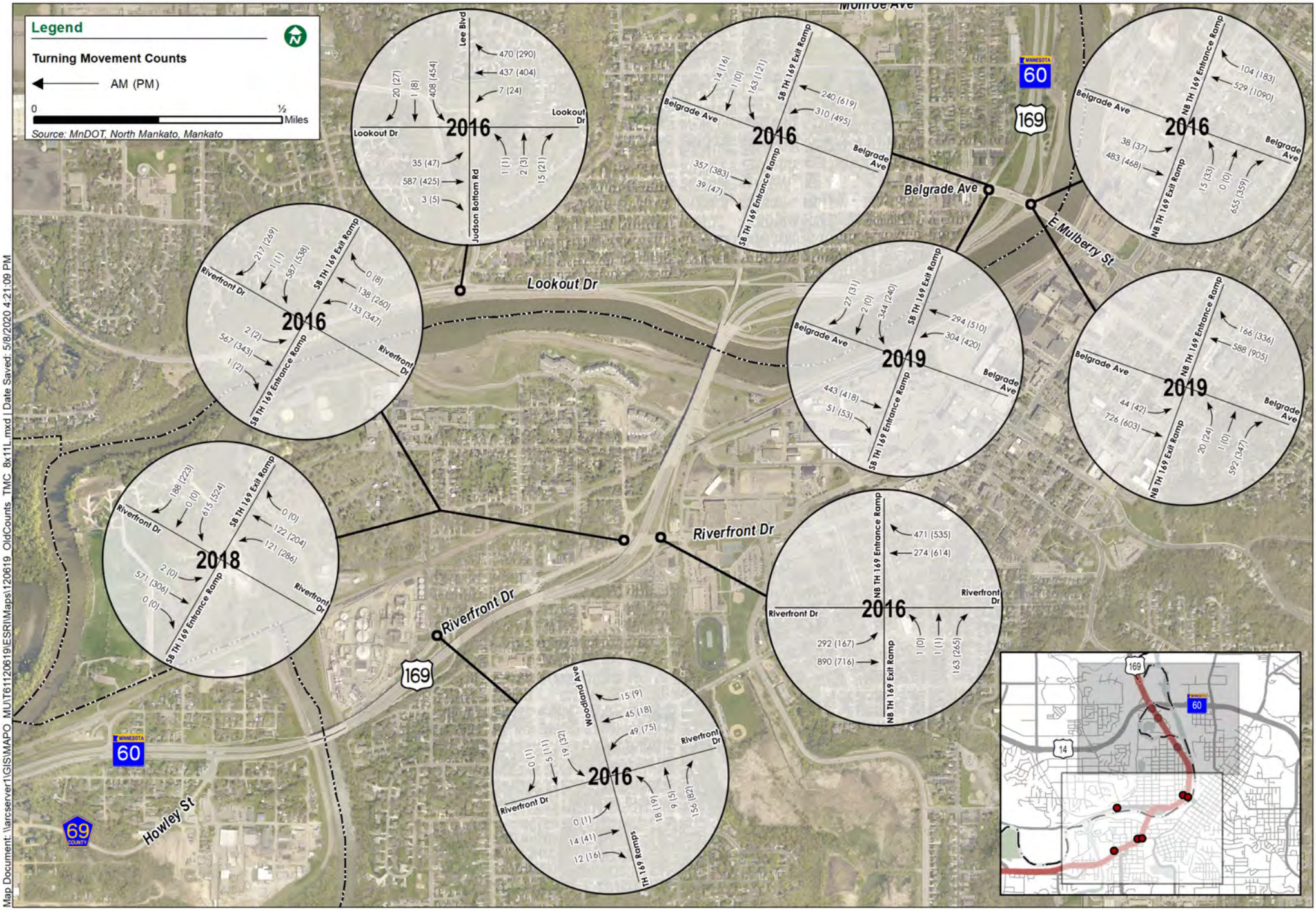

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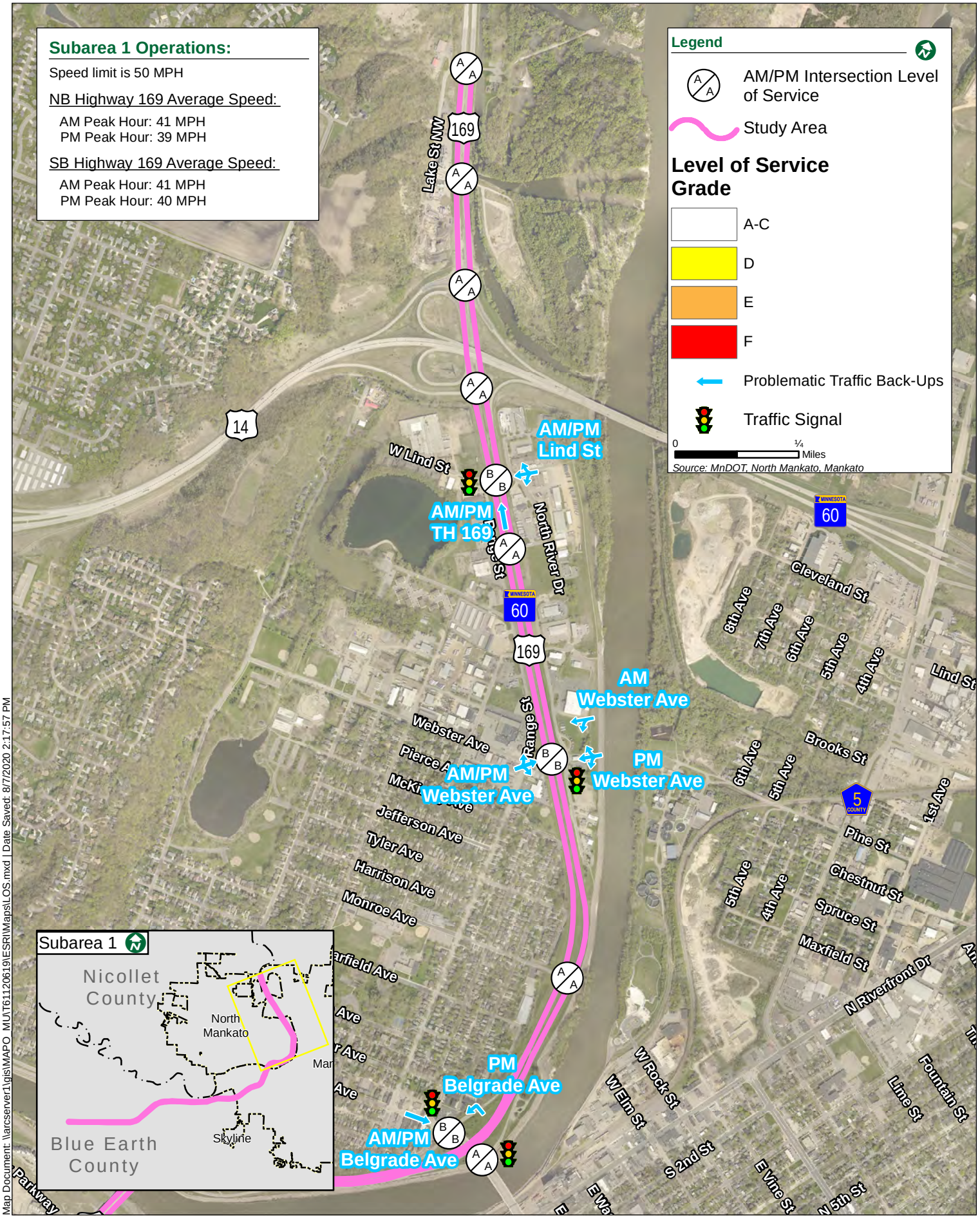

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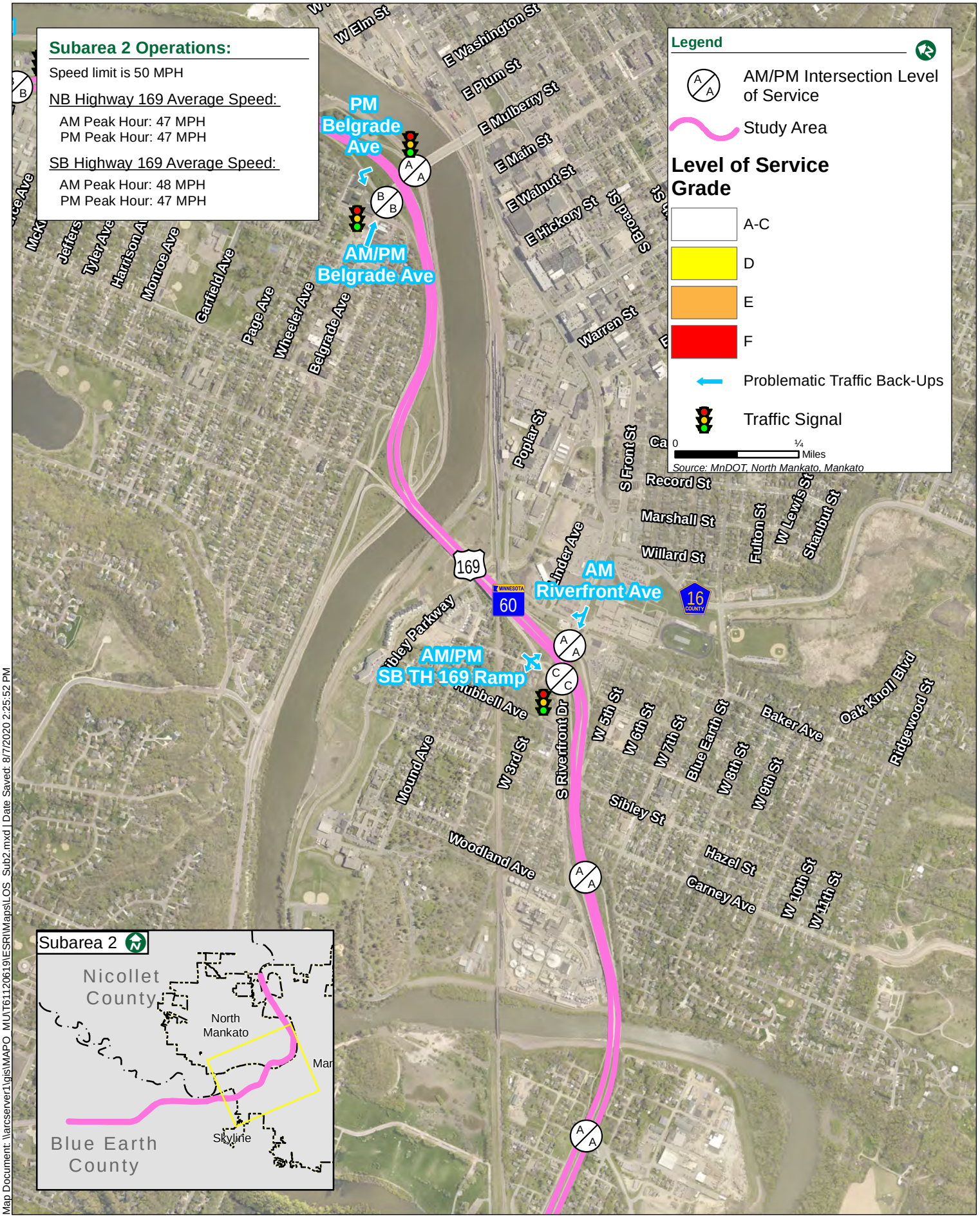

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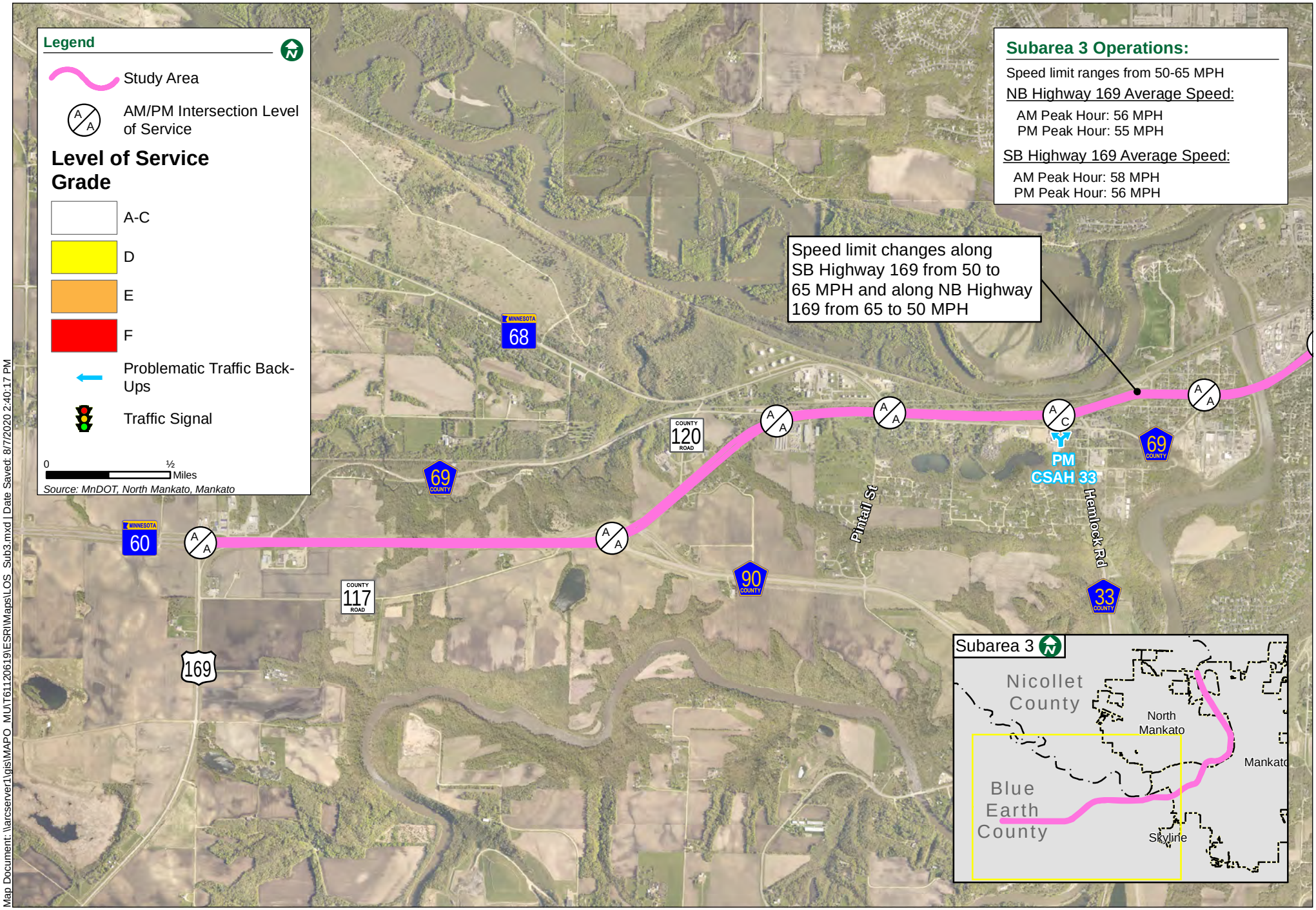

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Figure 11 Subarea 1 2040 Turning Movement Counts

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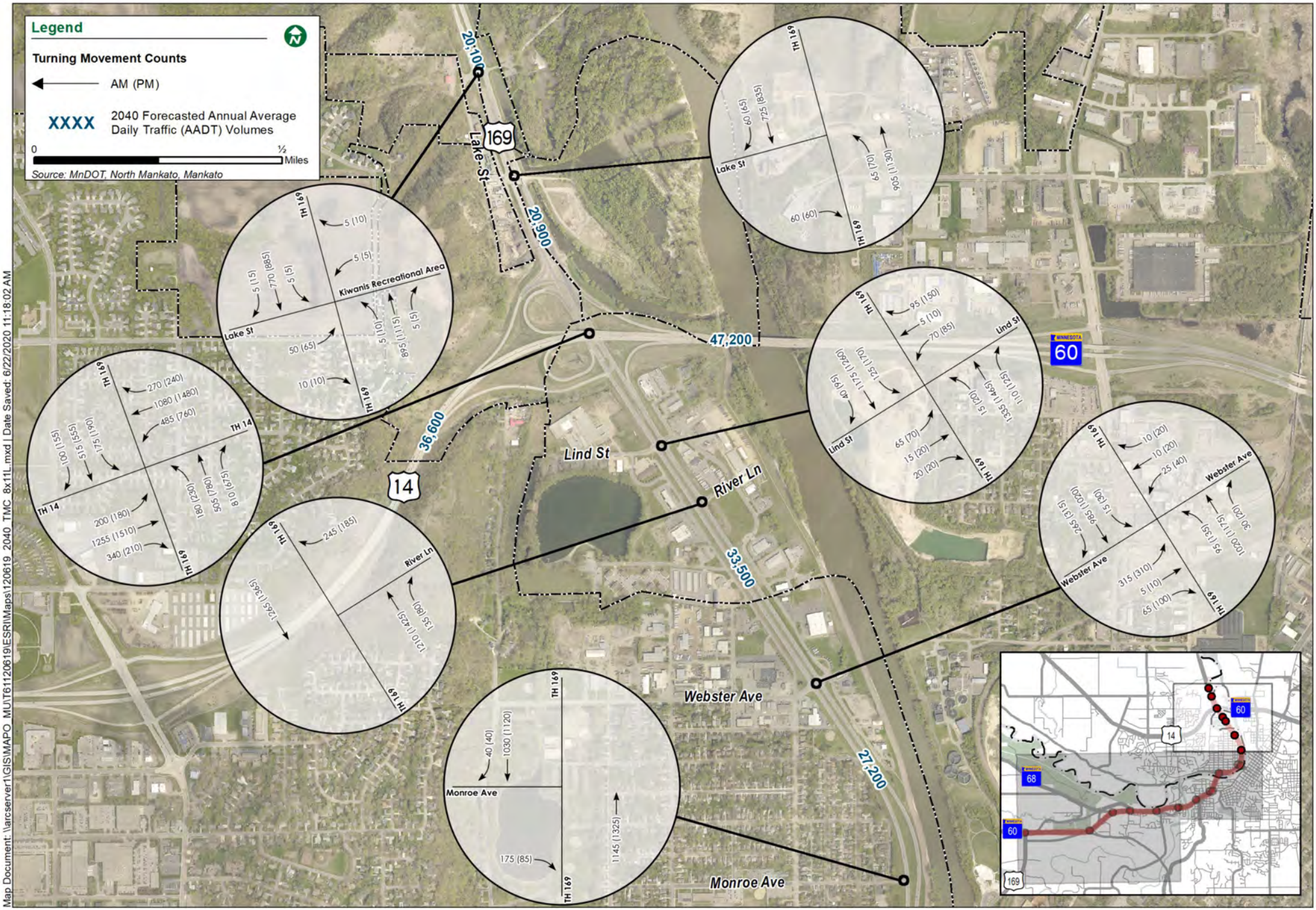

Figure 11 Subarea 2 2040 Turning Movement Counts

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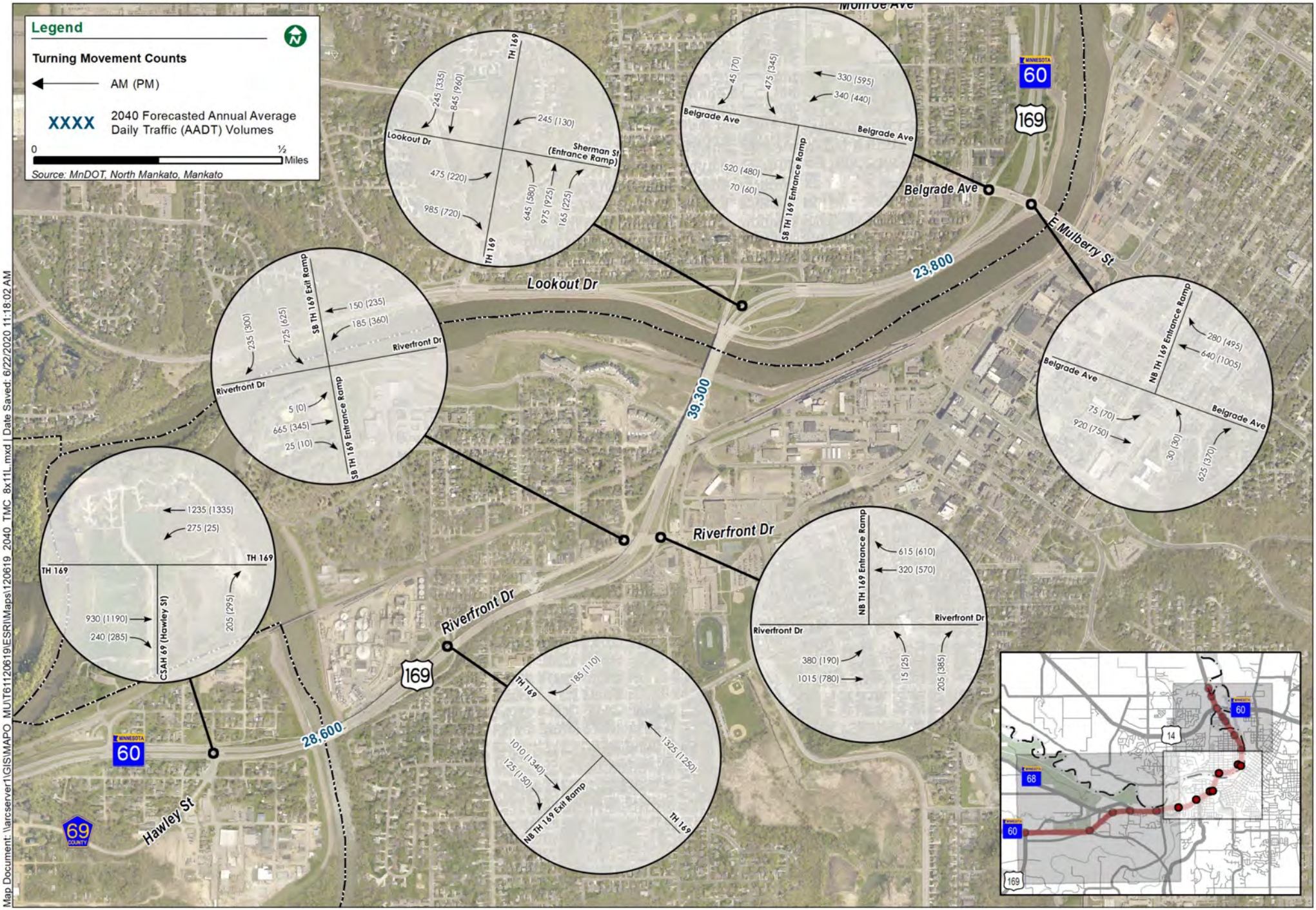

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Figure 11 Subarea 3 2040 Turning Movement Counts

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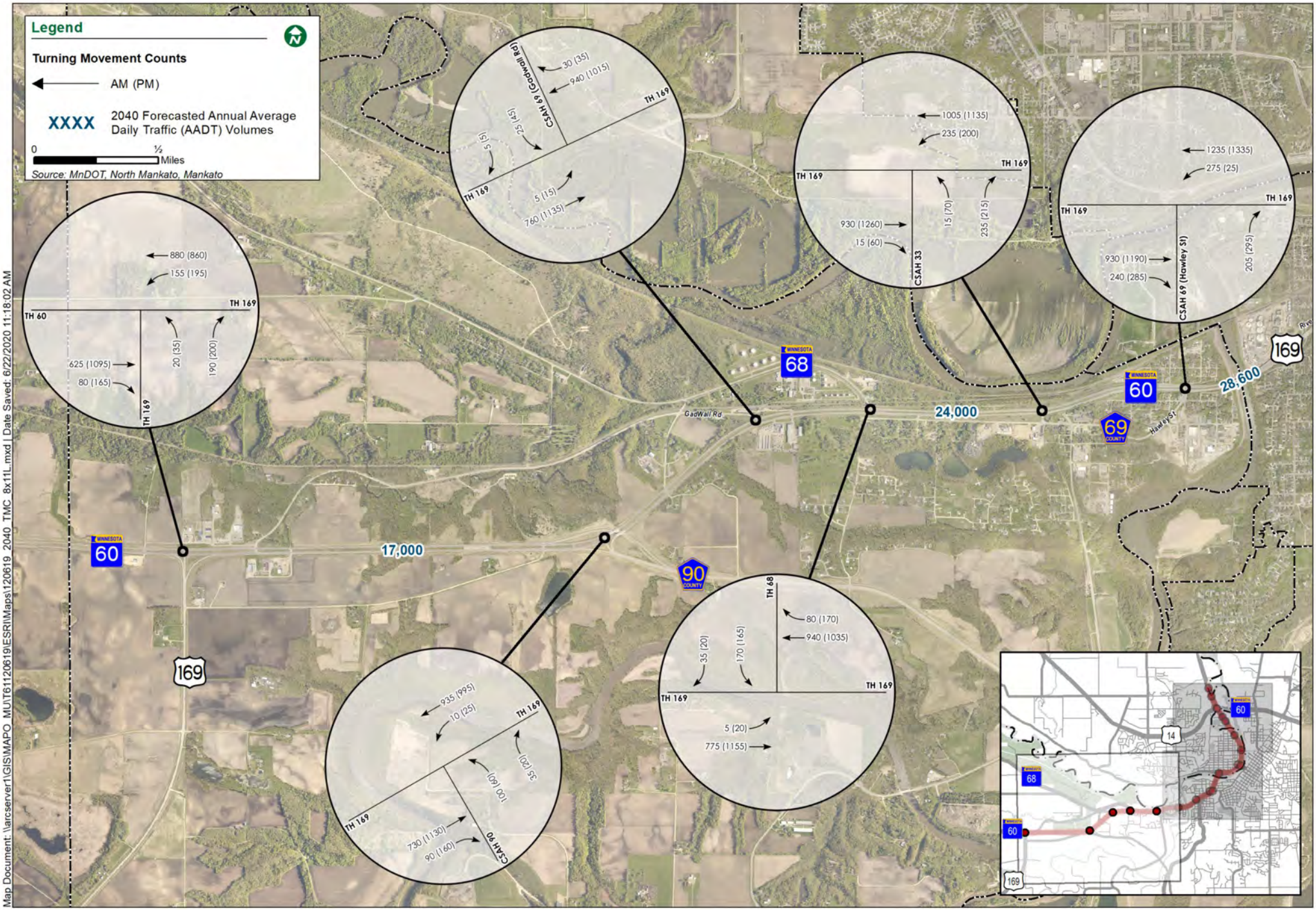

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Figure 12 Subarea 1 - 2040 No Build Traffic Operations

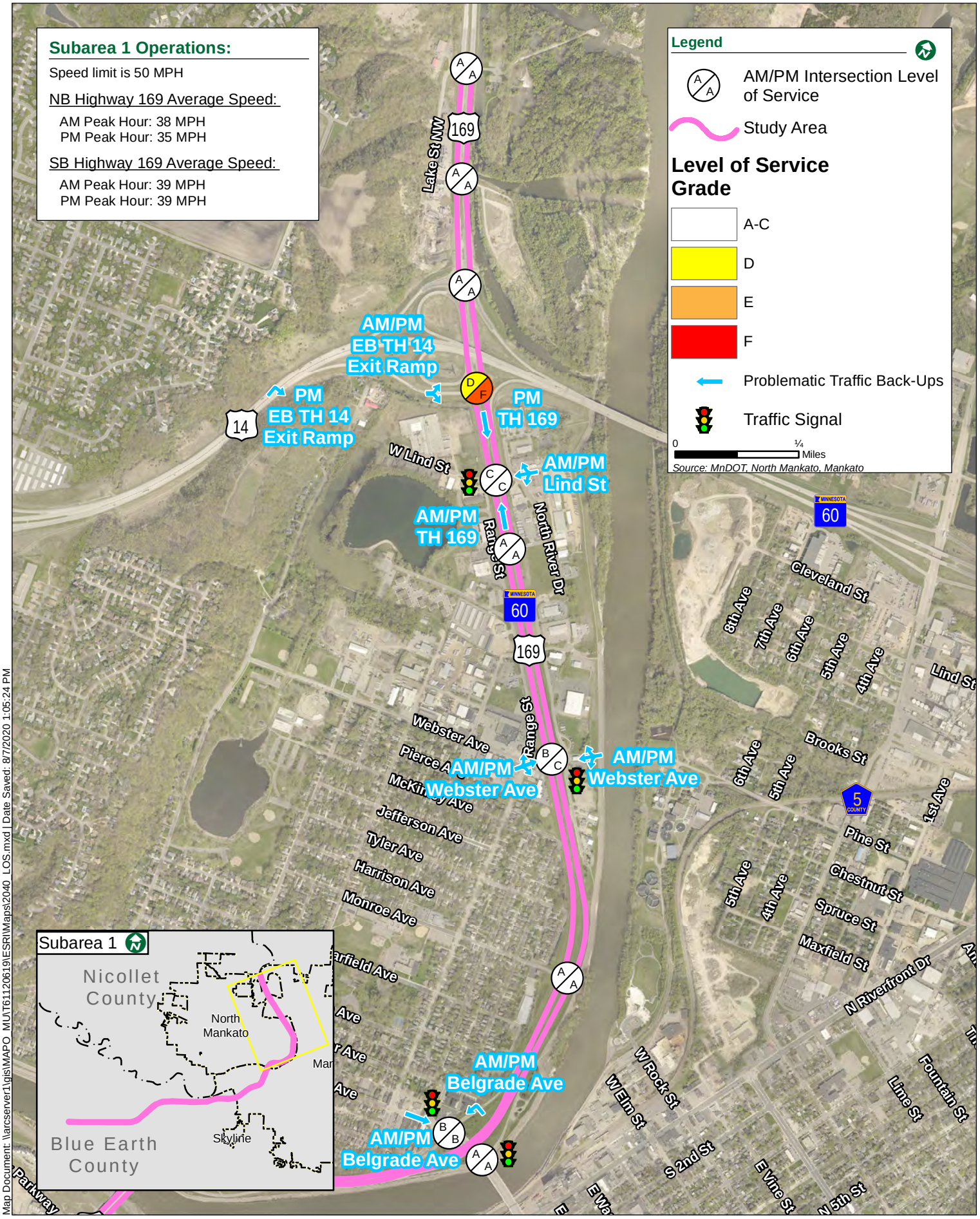
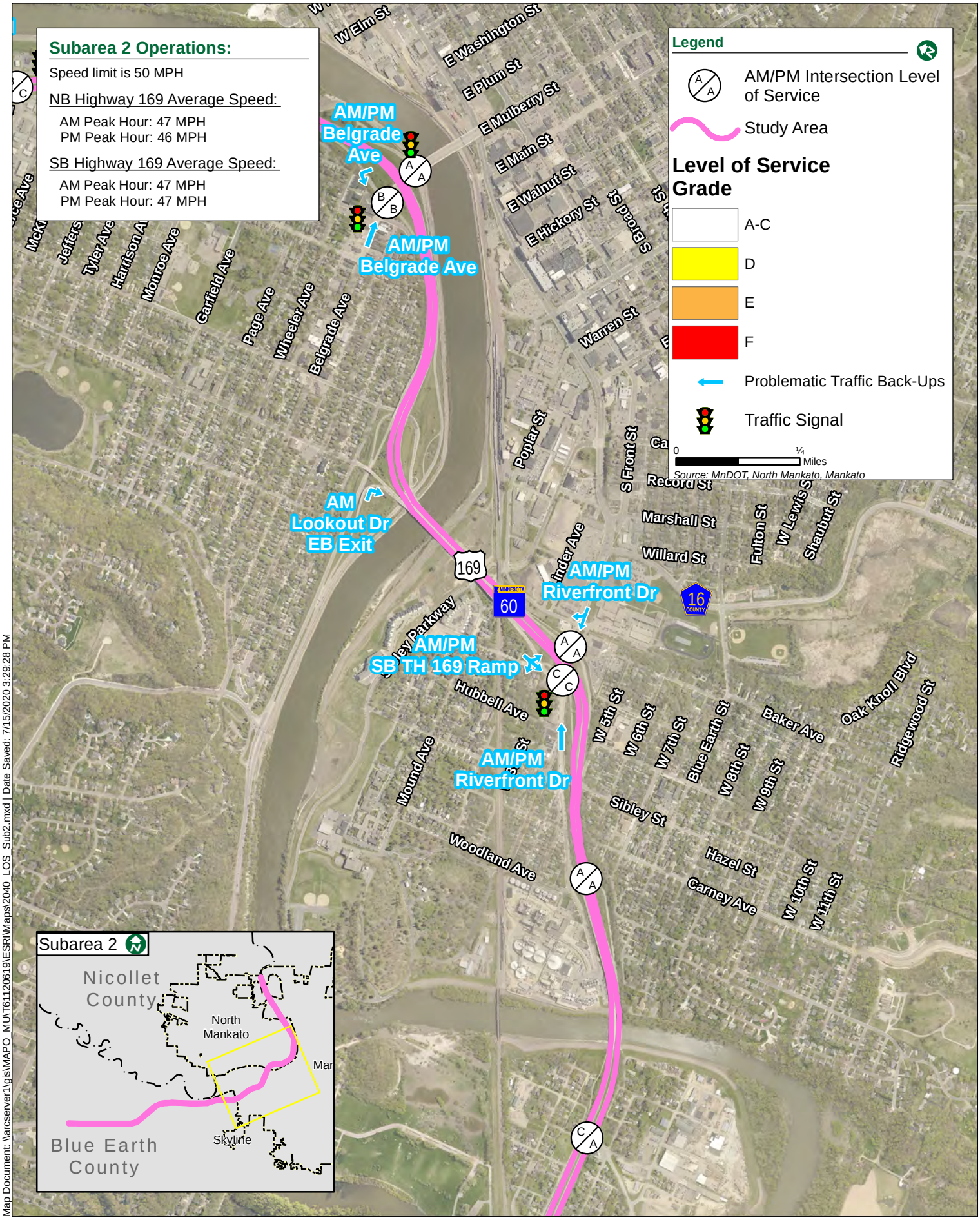


Figure 12 Subarea 2 - 2040 No Build Traffic Operations



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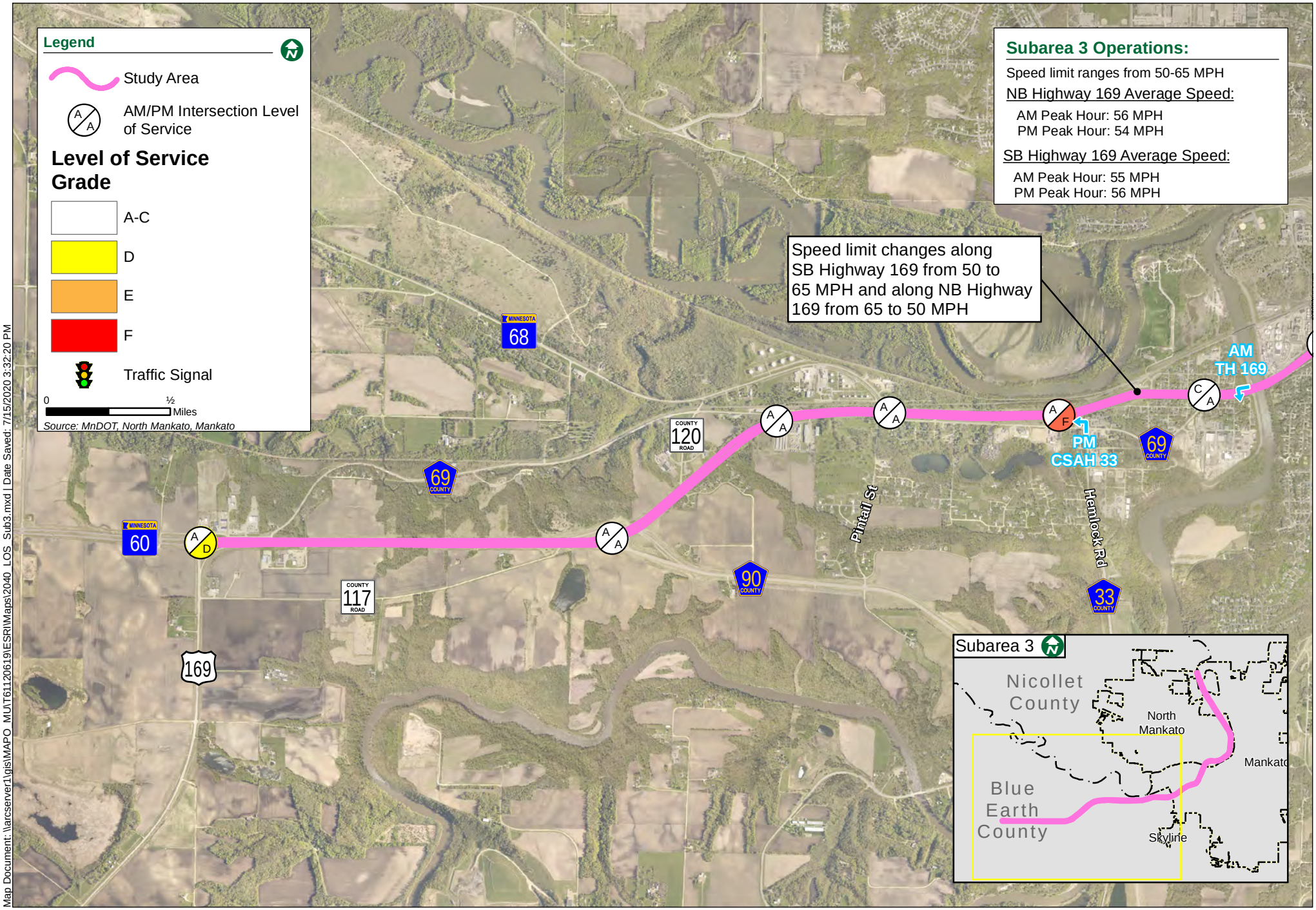

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Figure 13 Subarea 1 - Origin-Destination (All Vehicles)

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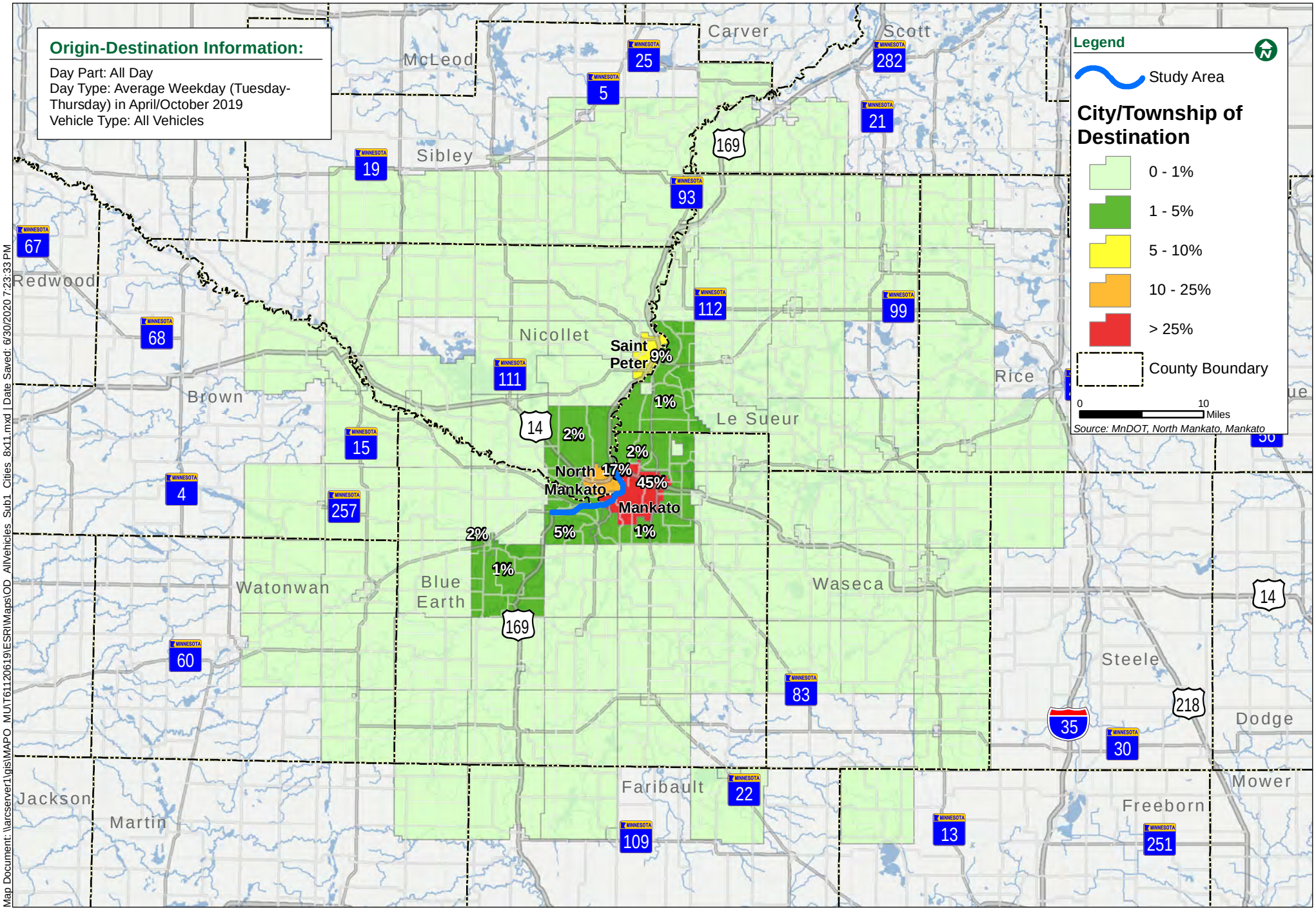

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Figure 13 Subarea 2 - Origin-Destination (All Vehicles)

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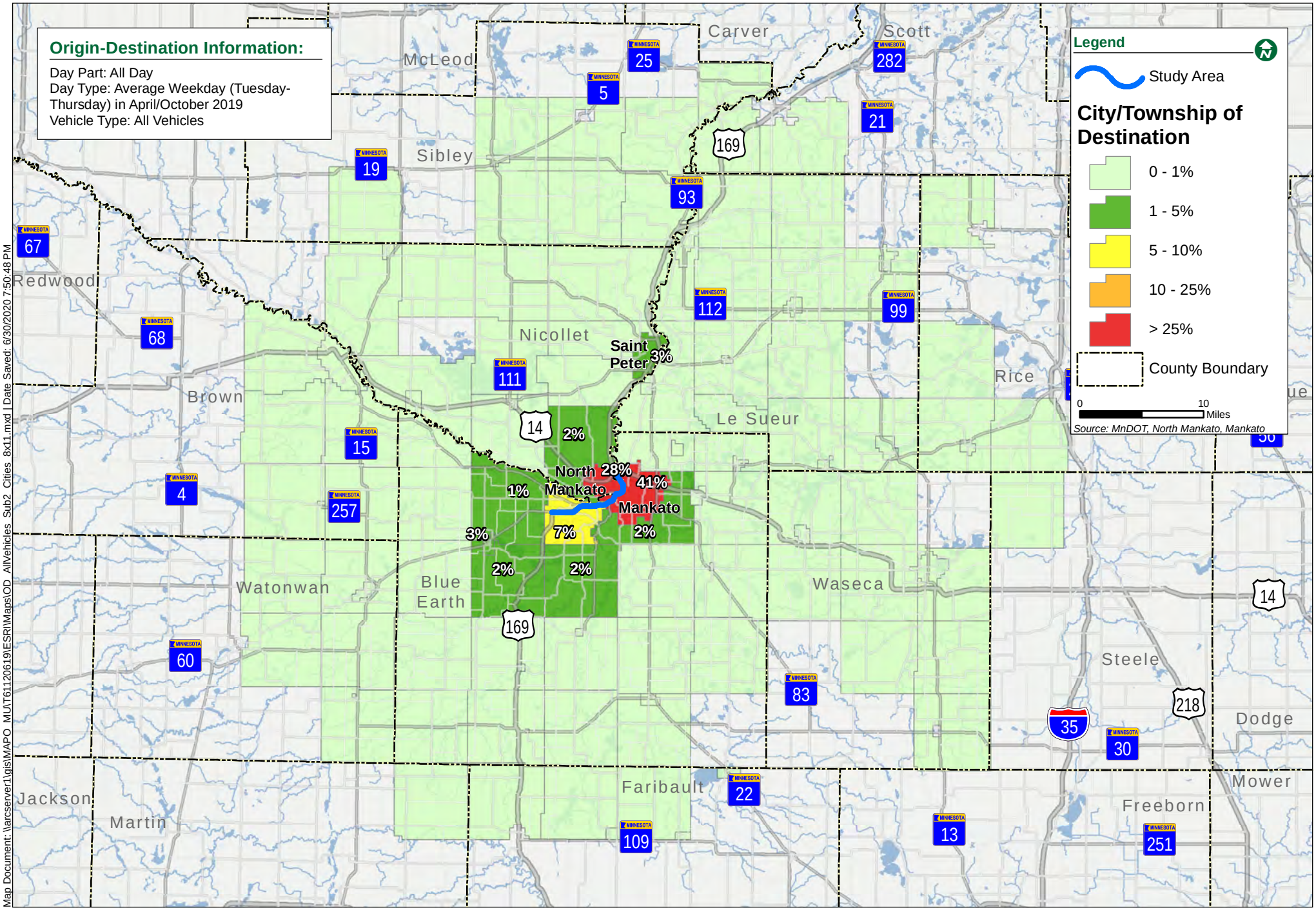

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Figure 13 Subarea 3 - Origin-Destination (All Vehicles)

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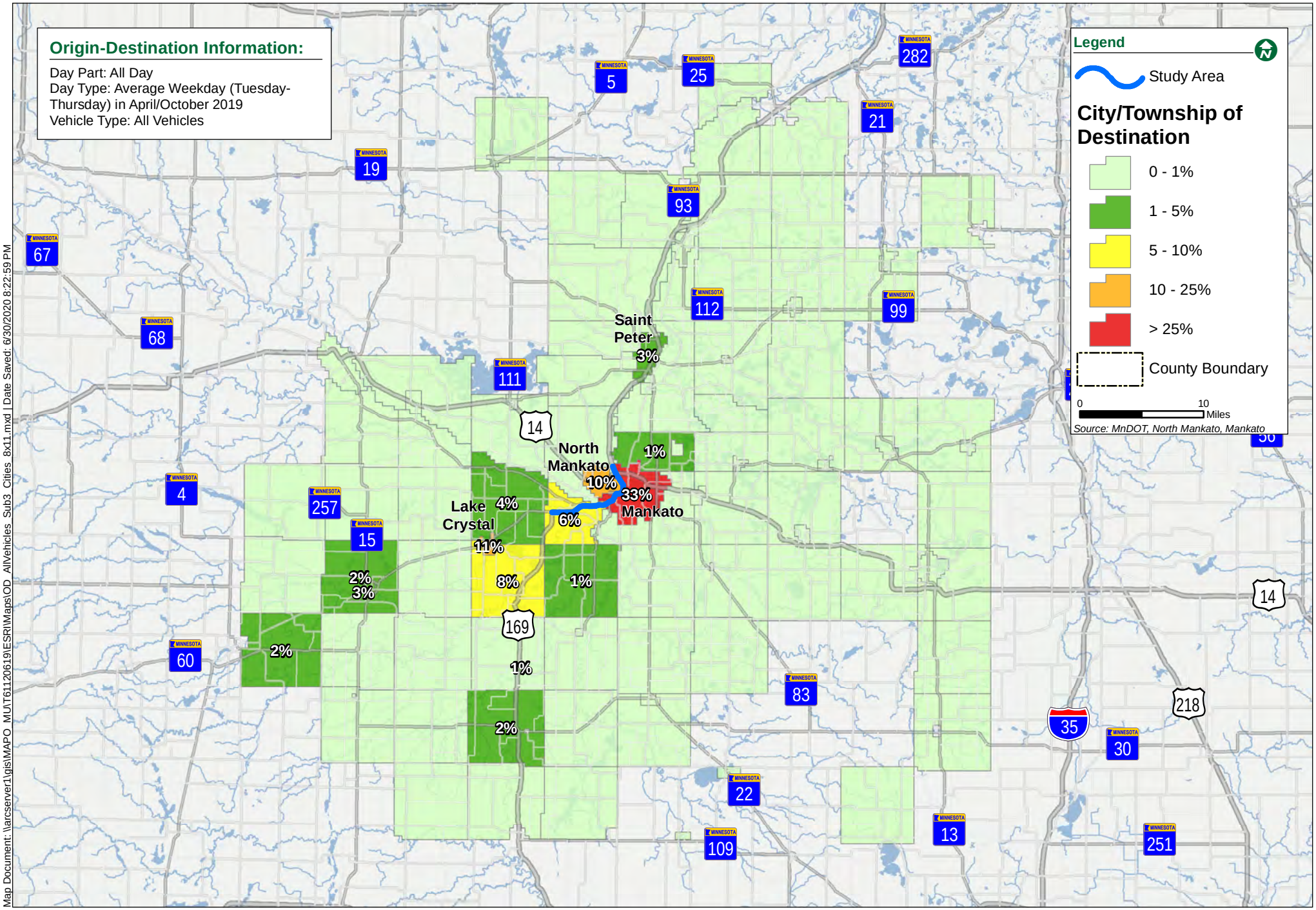

Figure 14 Subarea 1 - Origin-Destination (Trucks)

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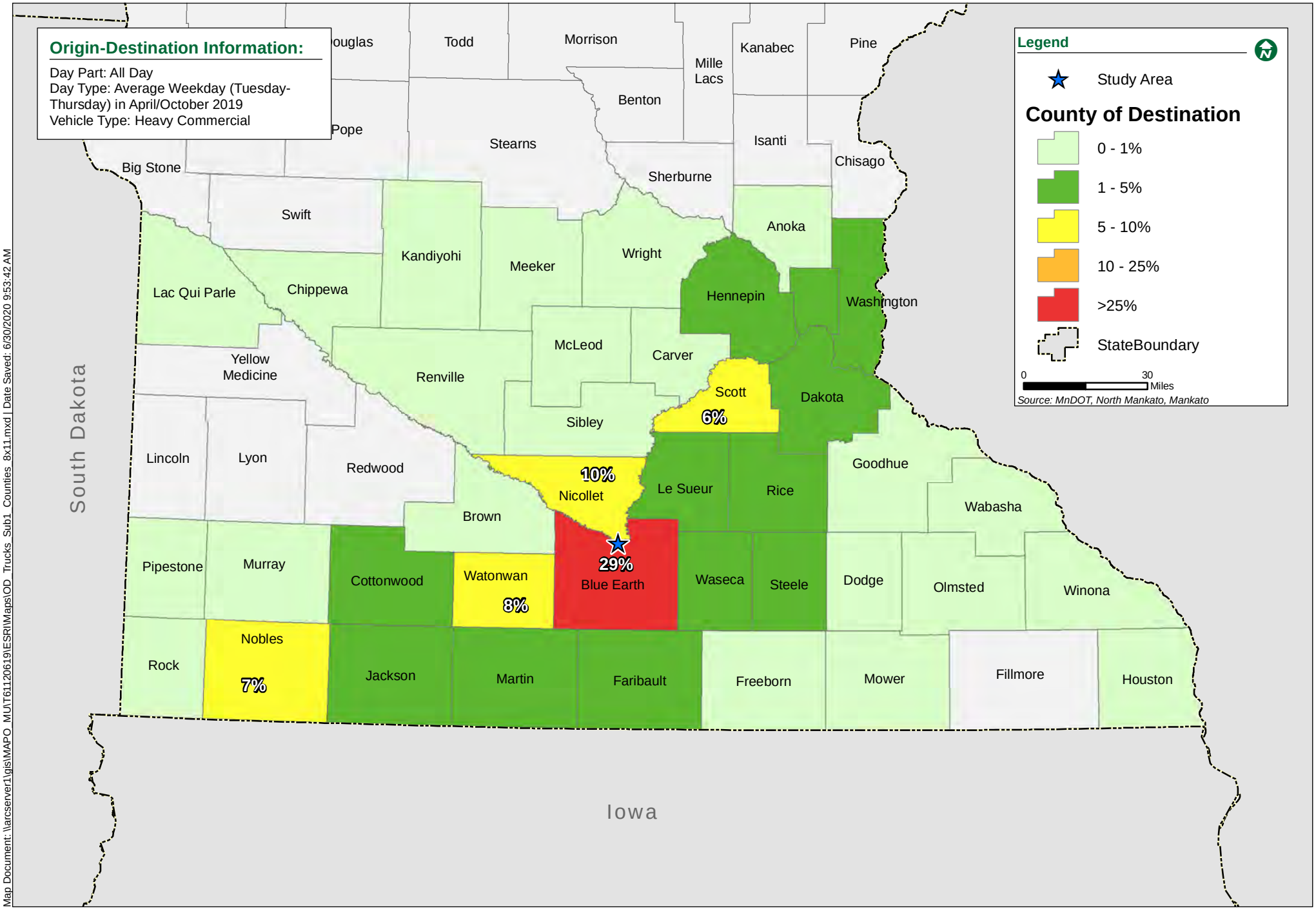

Figure 14 Subarea 2 - Origin-Destination (Trucks)

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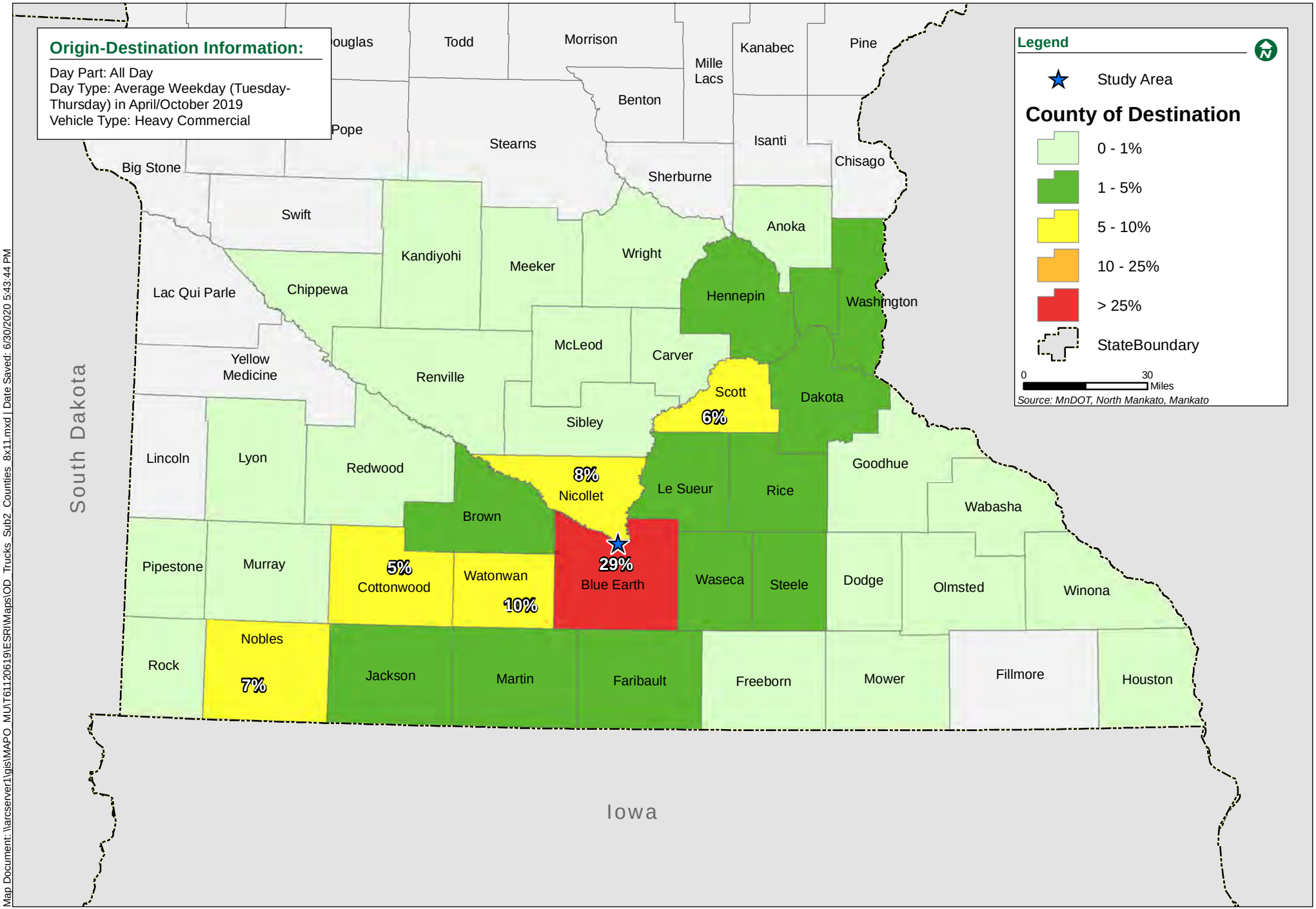

Figure 14 Subarea 3 - Origin-Destination (Trucks)

June 2020

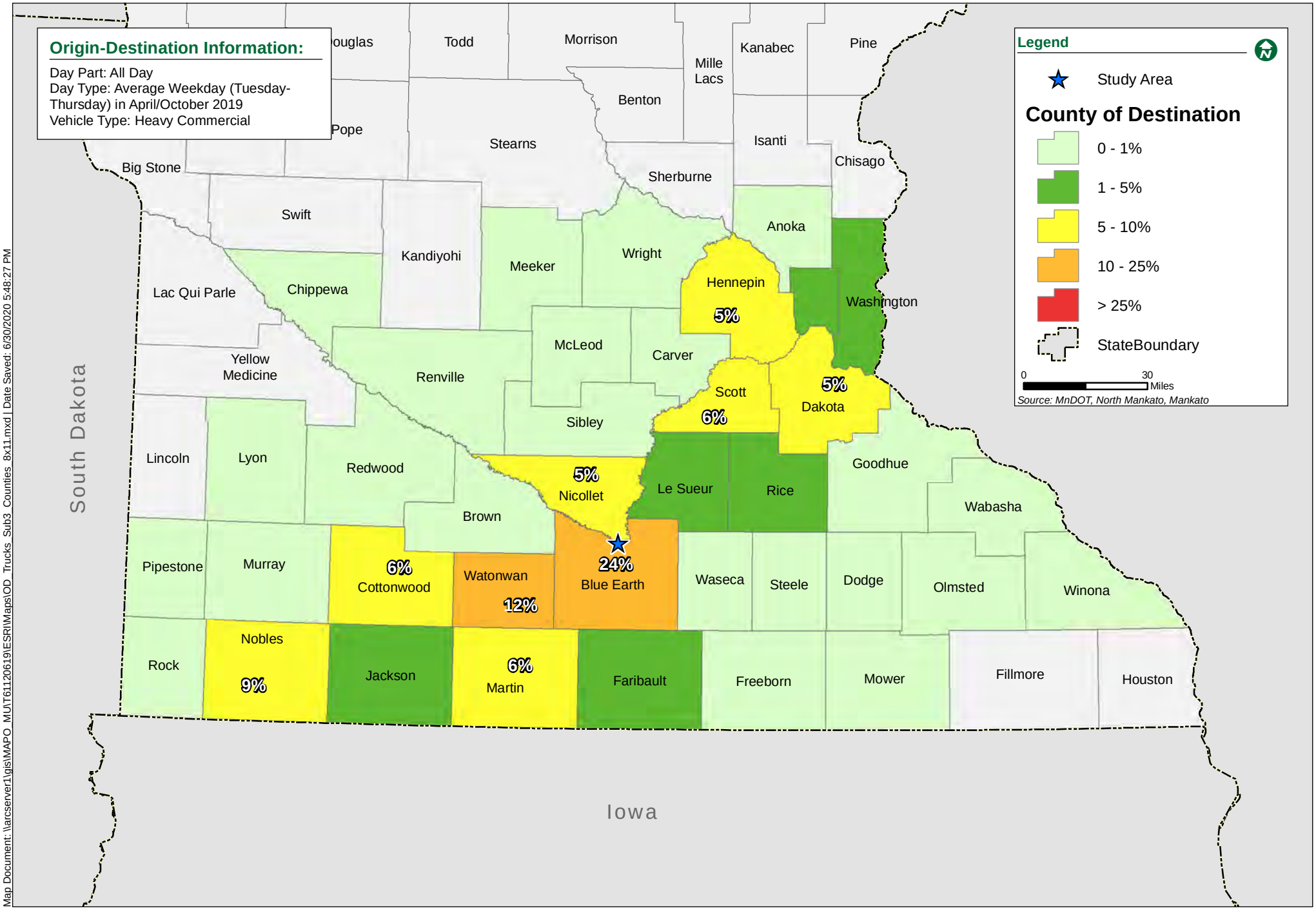

Figure 15

Highway 169 Corridor Study — Subarea 1 - Origin: TH 169 S of Belgrade Ave (All Vehicles)

Mankato/North Mankato Area Planning Organization (MAPO)

August 2020

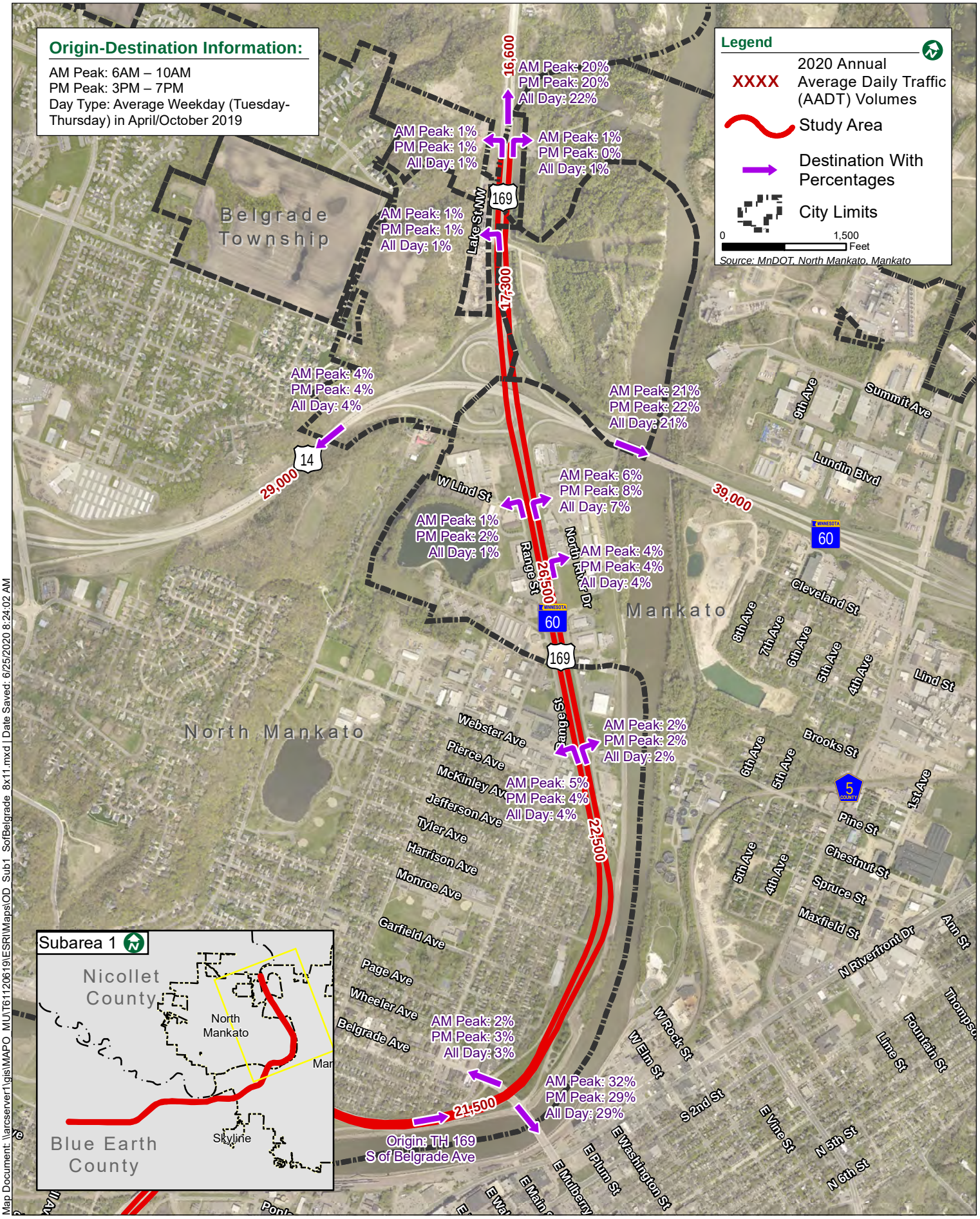

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Figure 15

Highway 169 Corridor Study

Subarea 1 - Origin: TH 169 S of Belgrade Ave (Trucks)

Mankato/North Mankato Area Planning Organization (MAPO)

August 2020

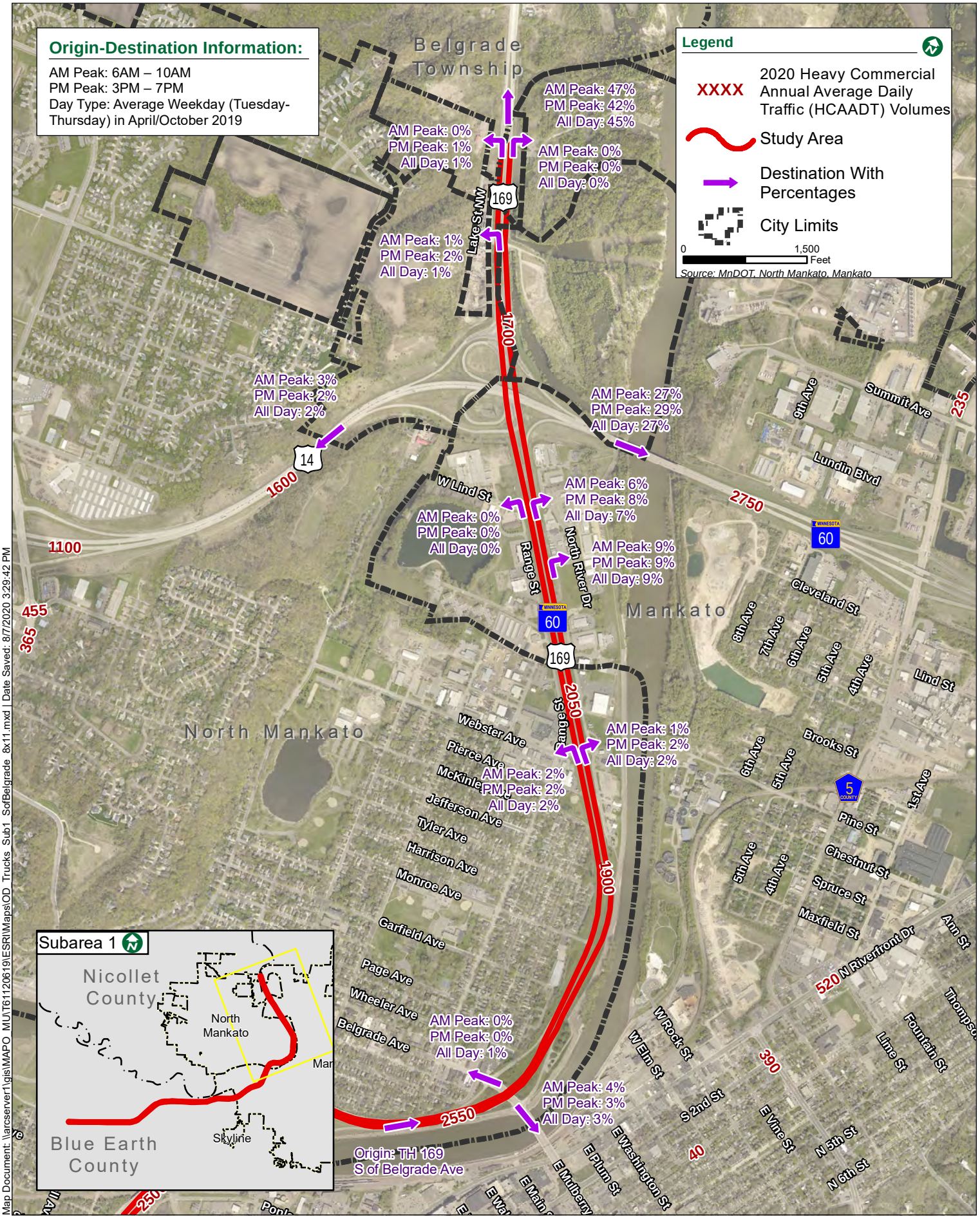

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Figure 16

Highway 169 Corridor Study

Subarea 1 - Origin: TH 169 N of Lake St (All Vehicles)

Mankato/North Mankato Area Planning Organization (MAPO)

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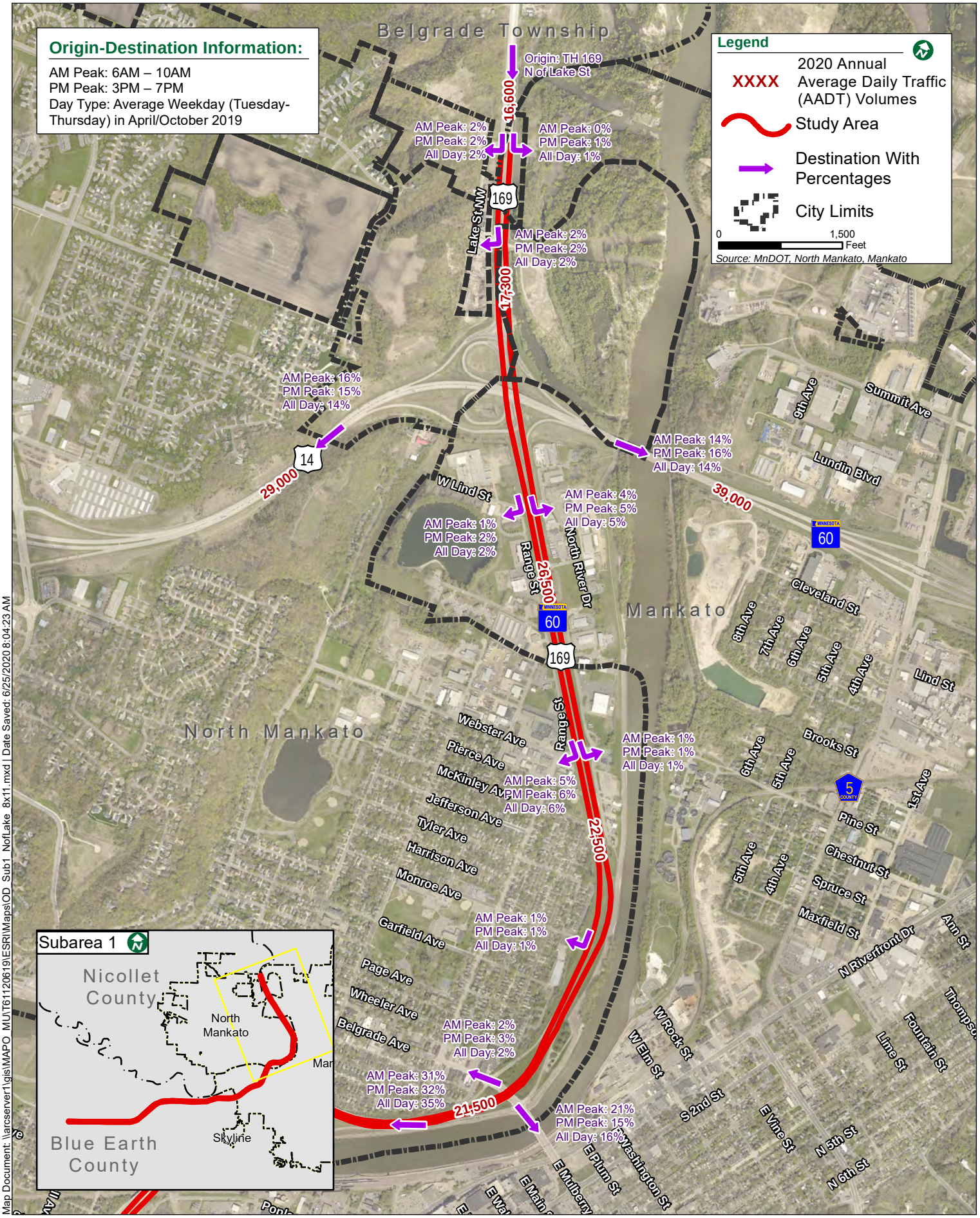

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Figure 16

Highway 169 Corridor Study

Subarea 1 - Origin: TH 169 N of Lake St (Trucks)

Mankato/North Mankato Area Planning Organization (MAPO)

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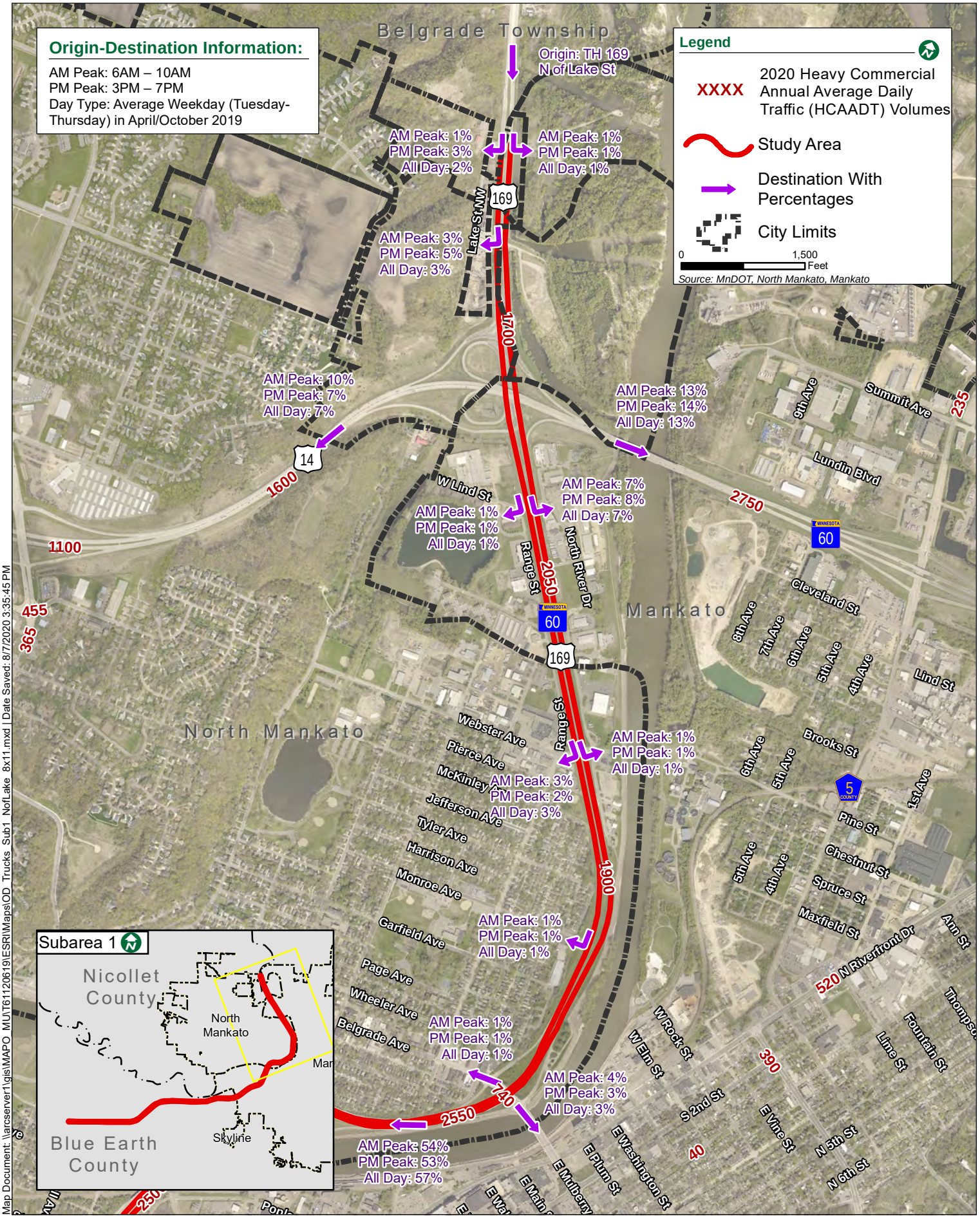

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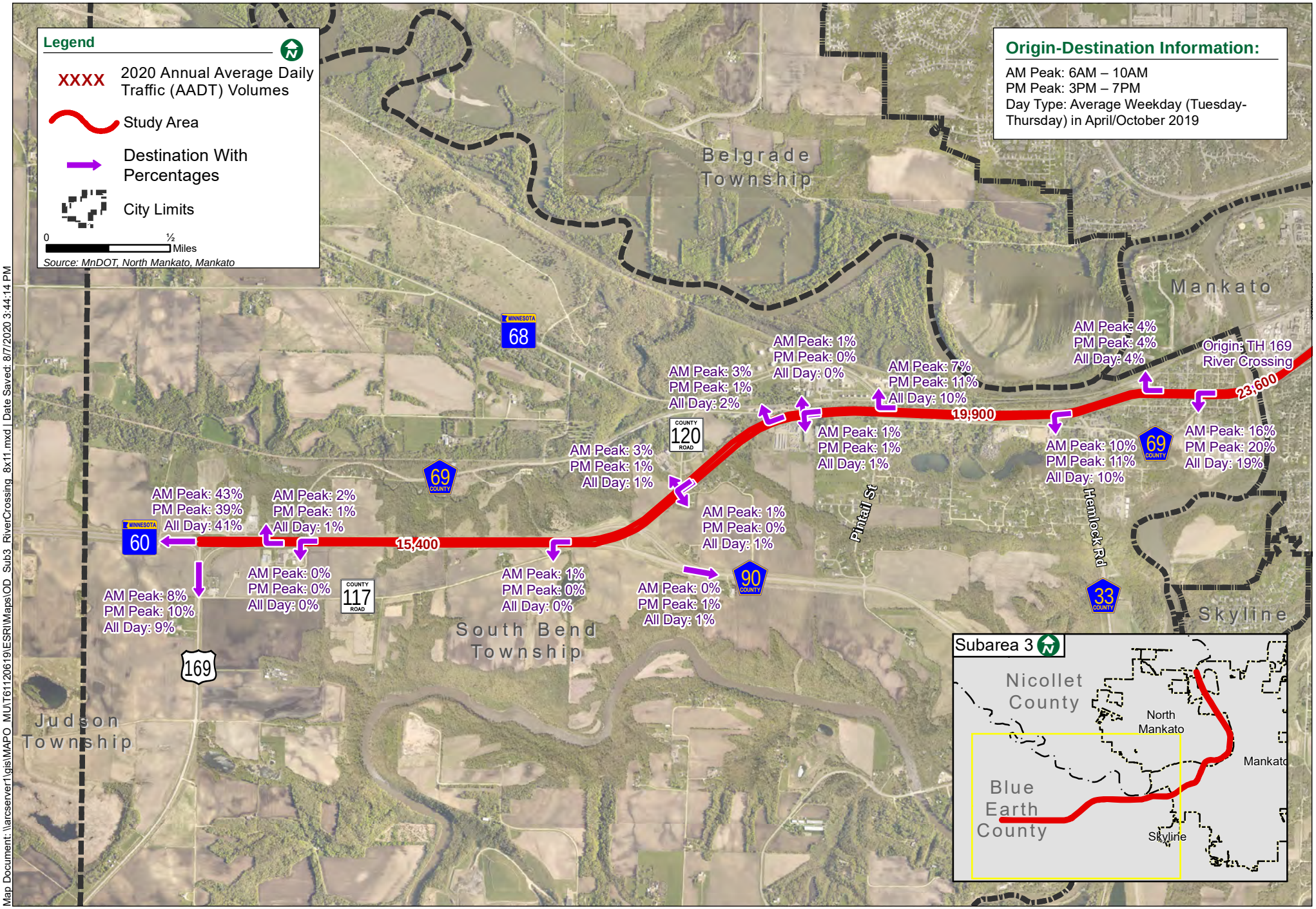
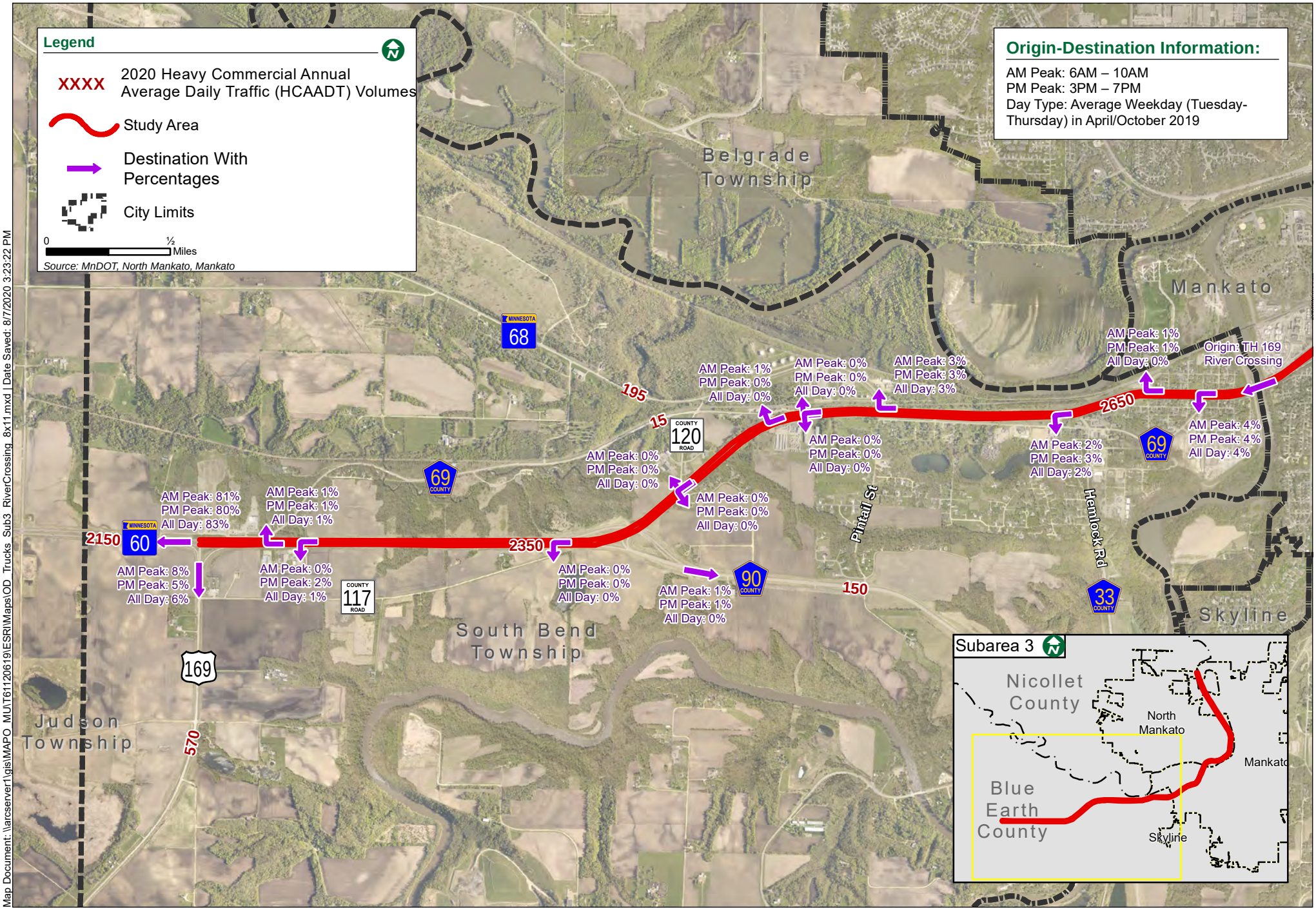
Figure 17 Subarea 3 - Origin: TH 169 at River Crossing (All Vehicles)

August 2020





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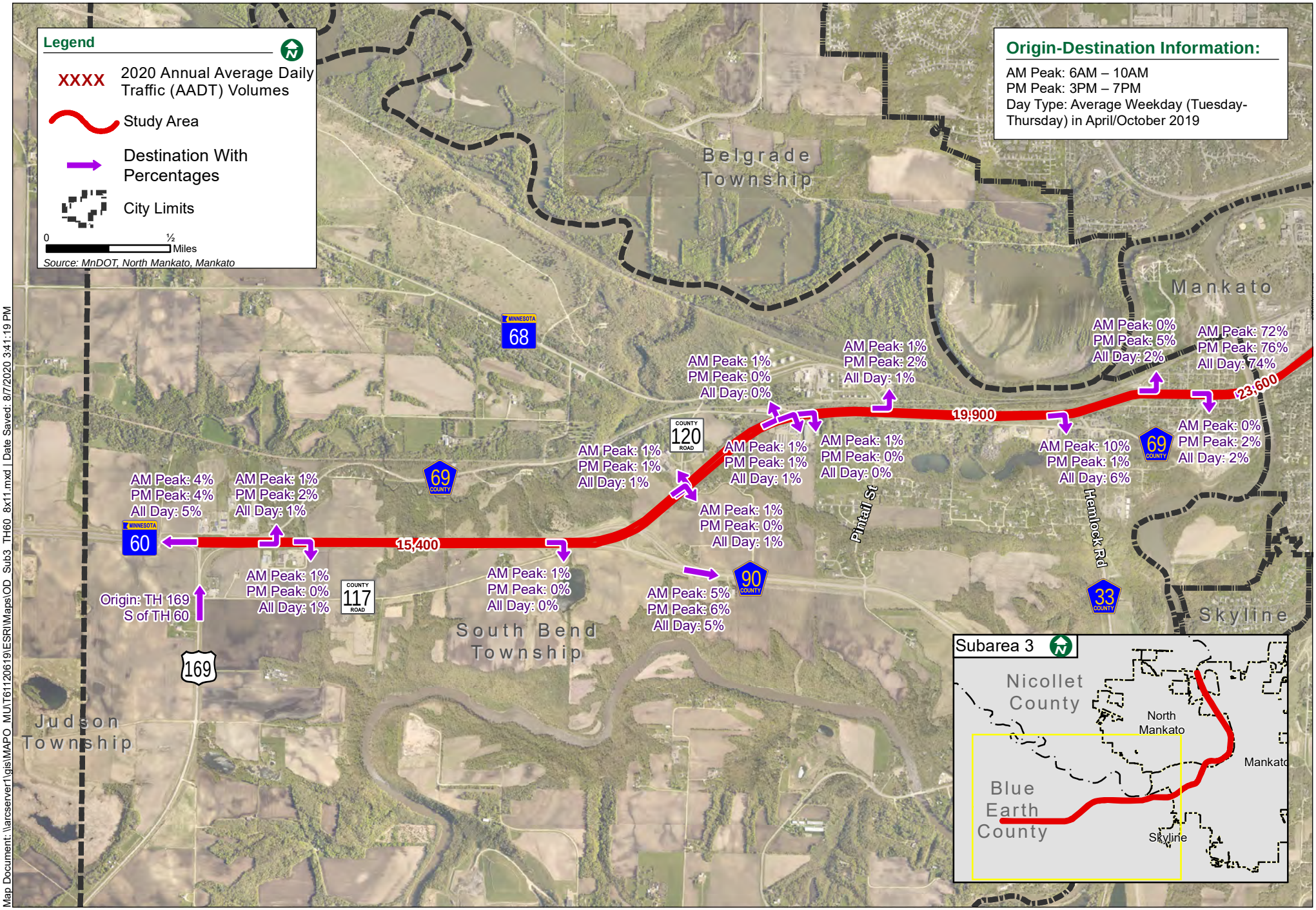

Figure 18 Subarea 3 - Origin: TH 169 S of TH 60 (Trucks)

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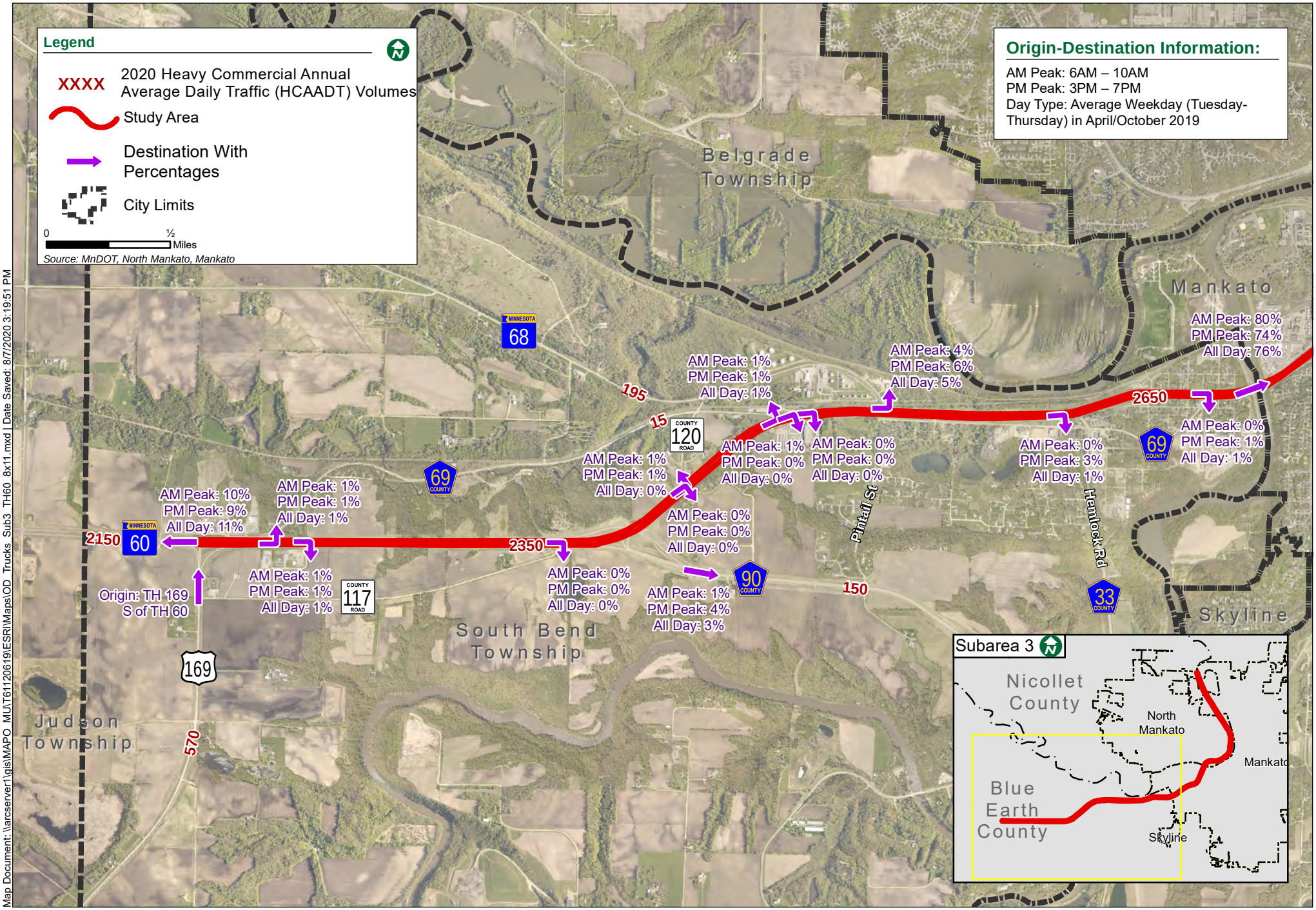

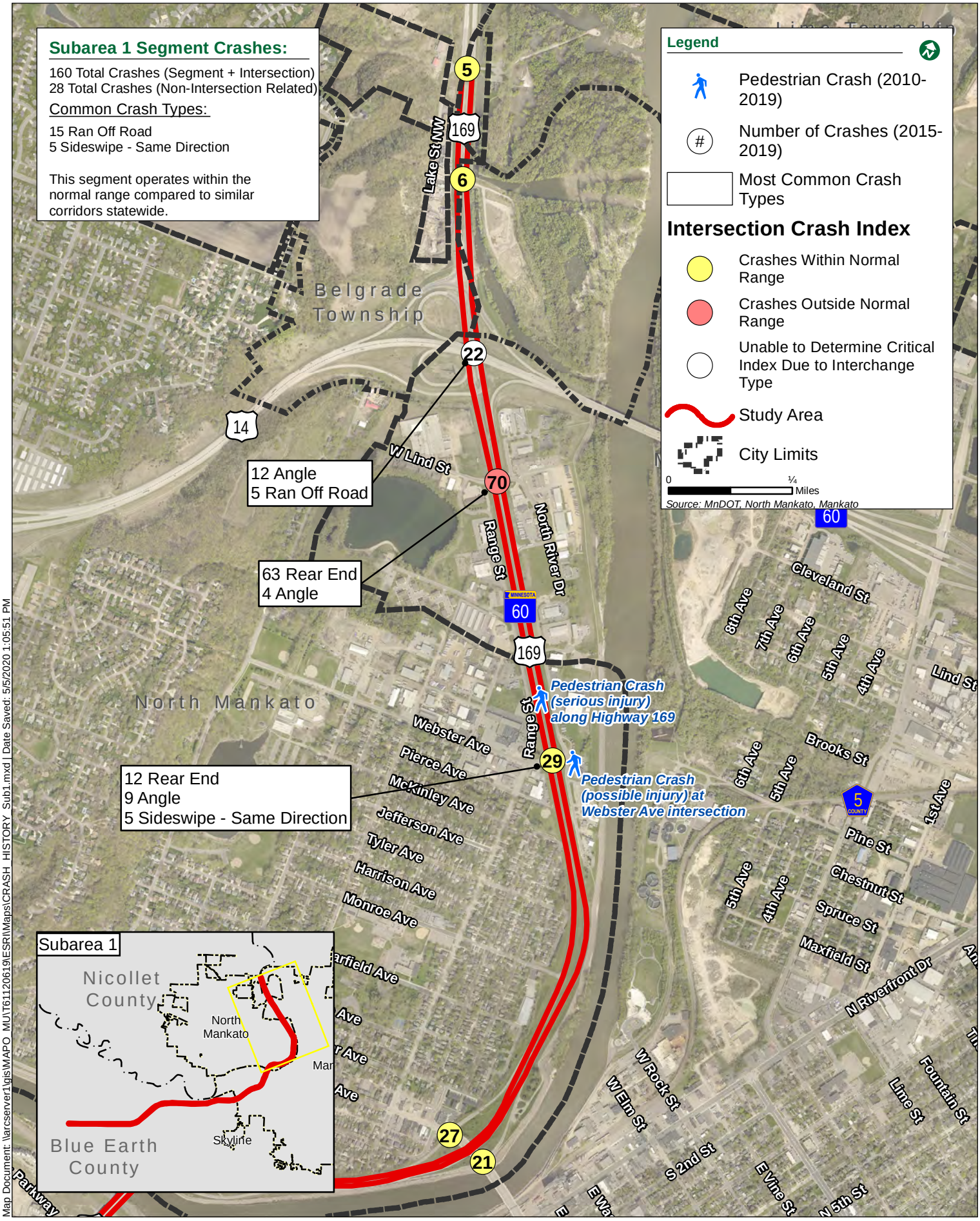

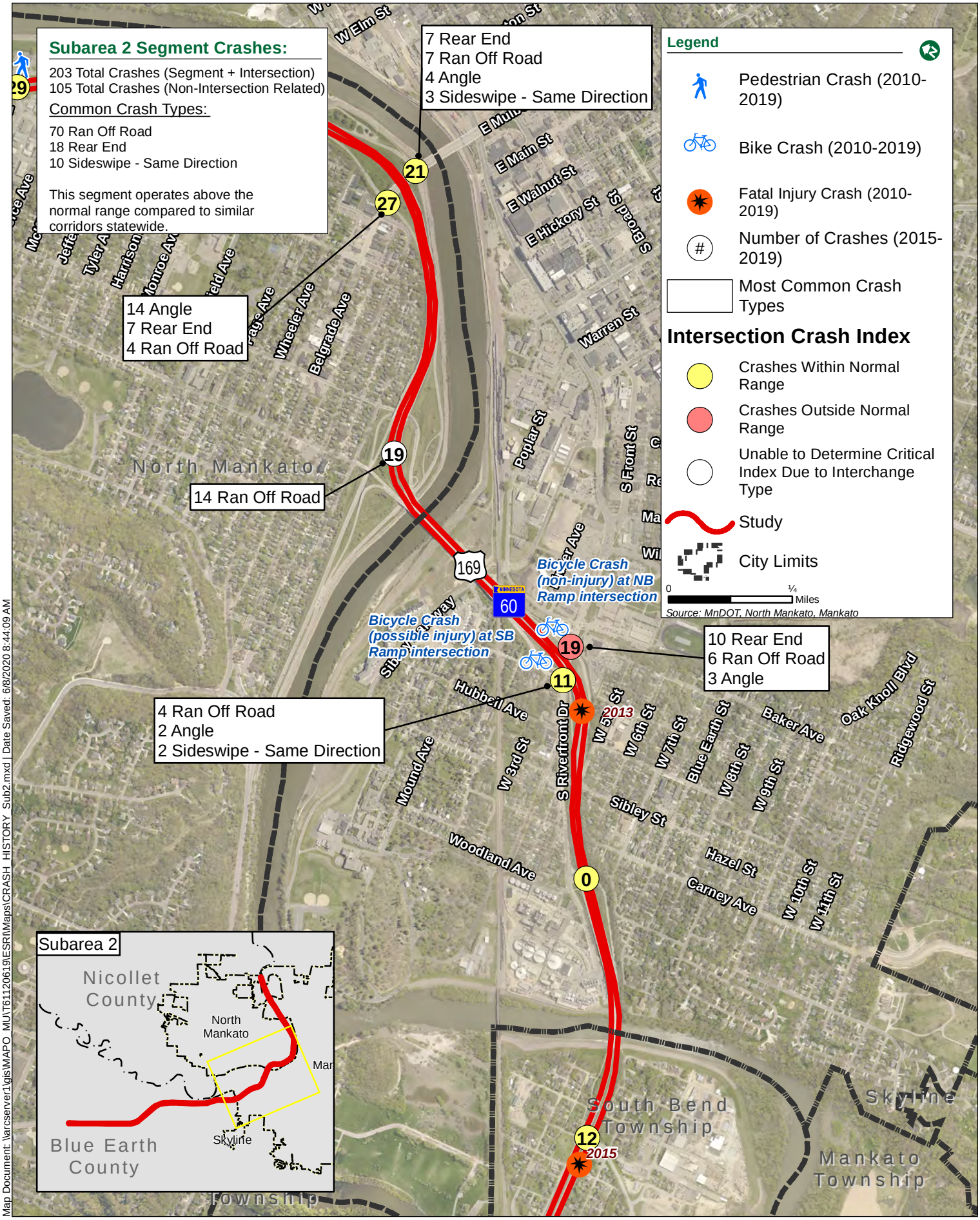

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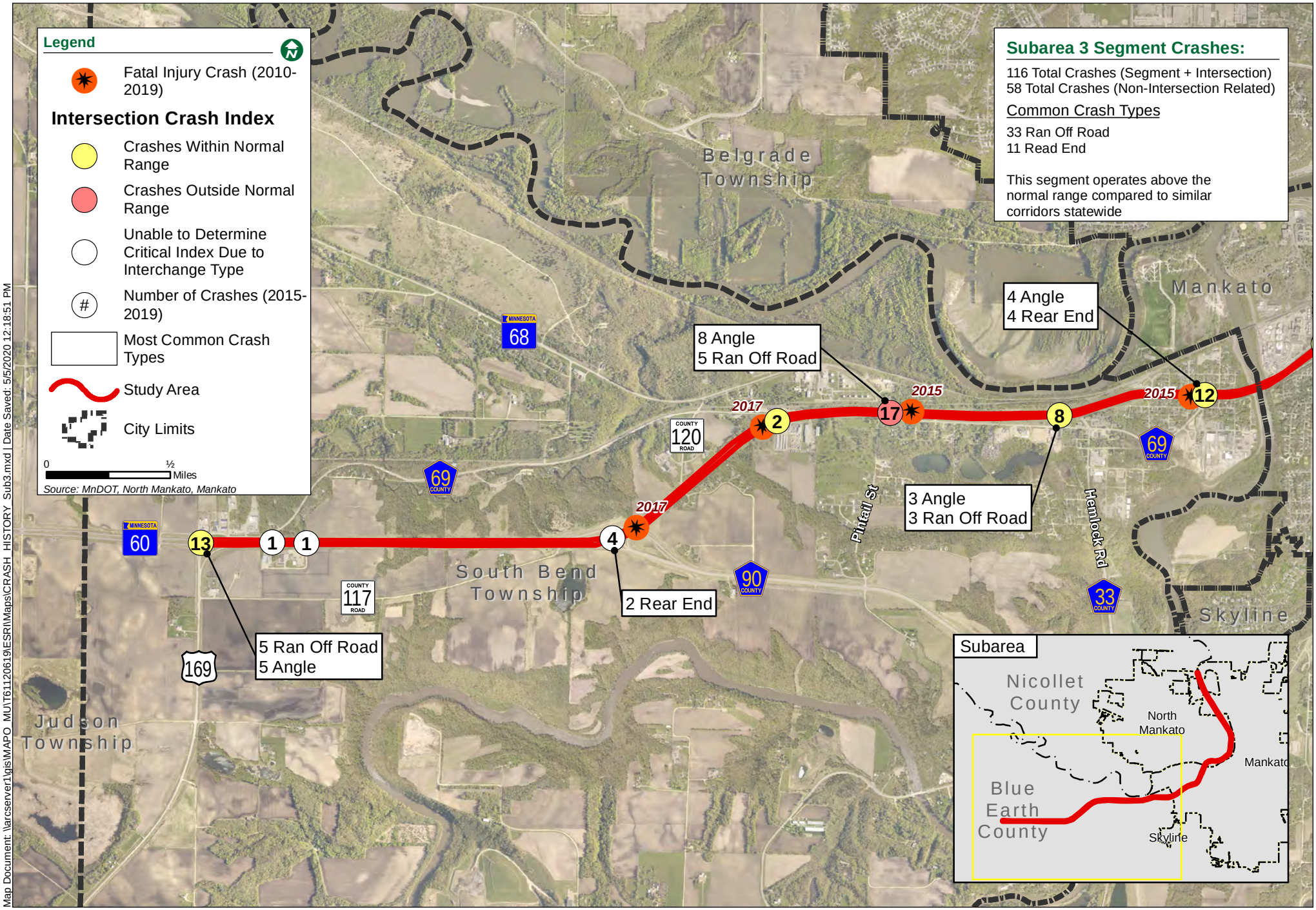

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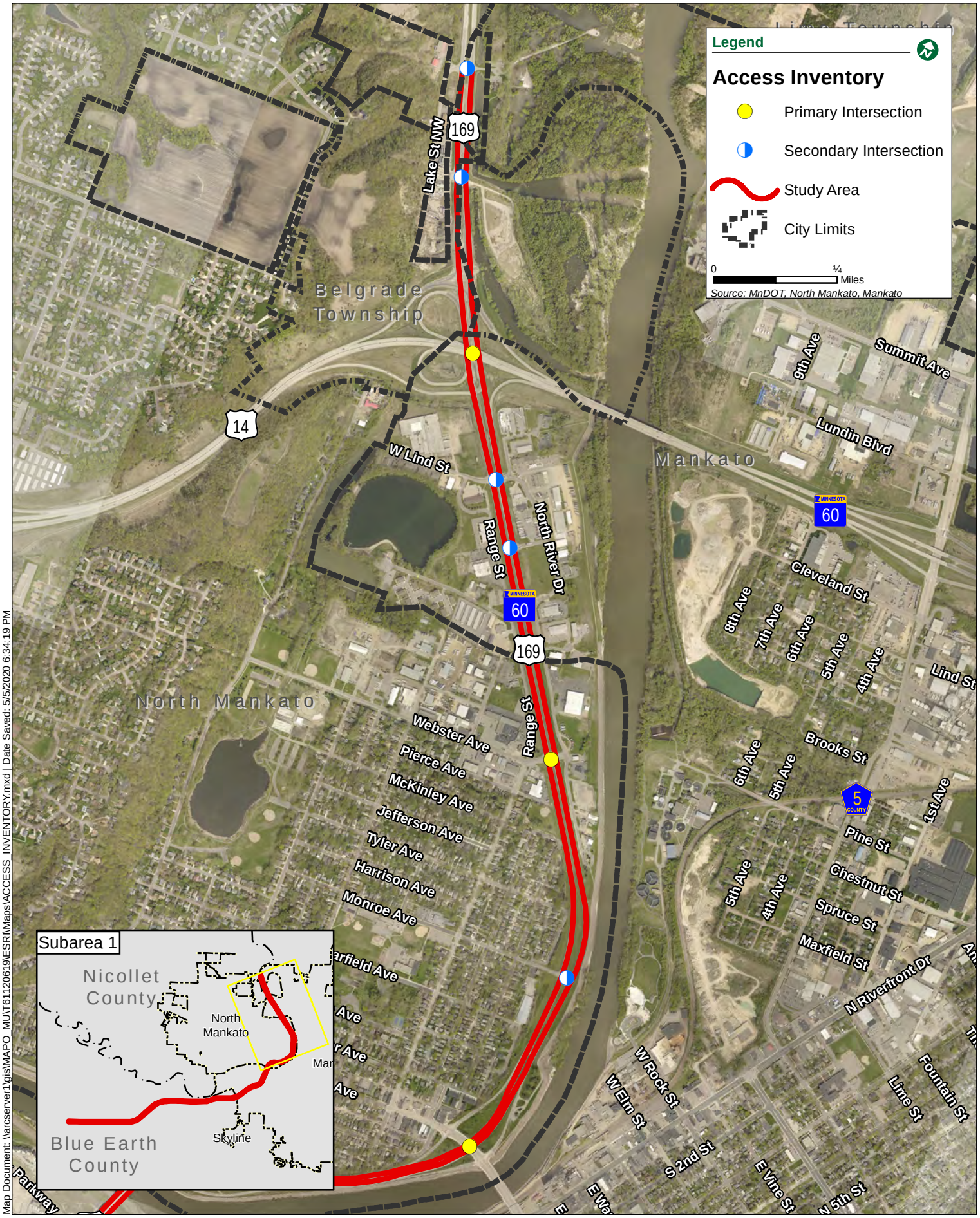


Figure 20 Subarea 2 - ACCESS INVENTORY

May 2020

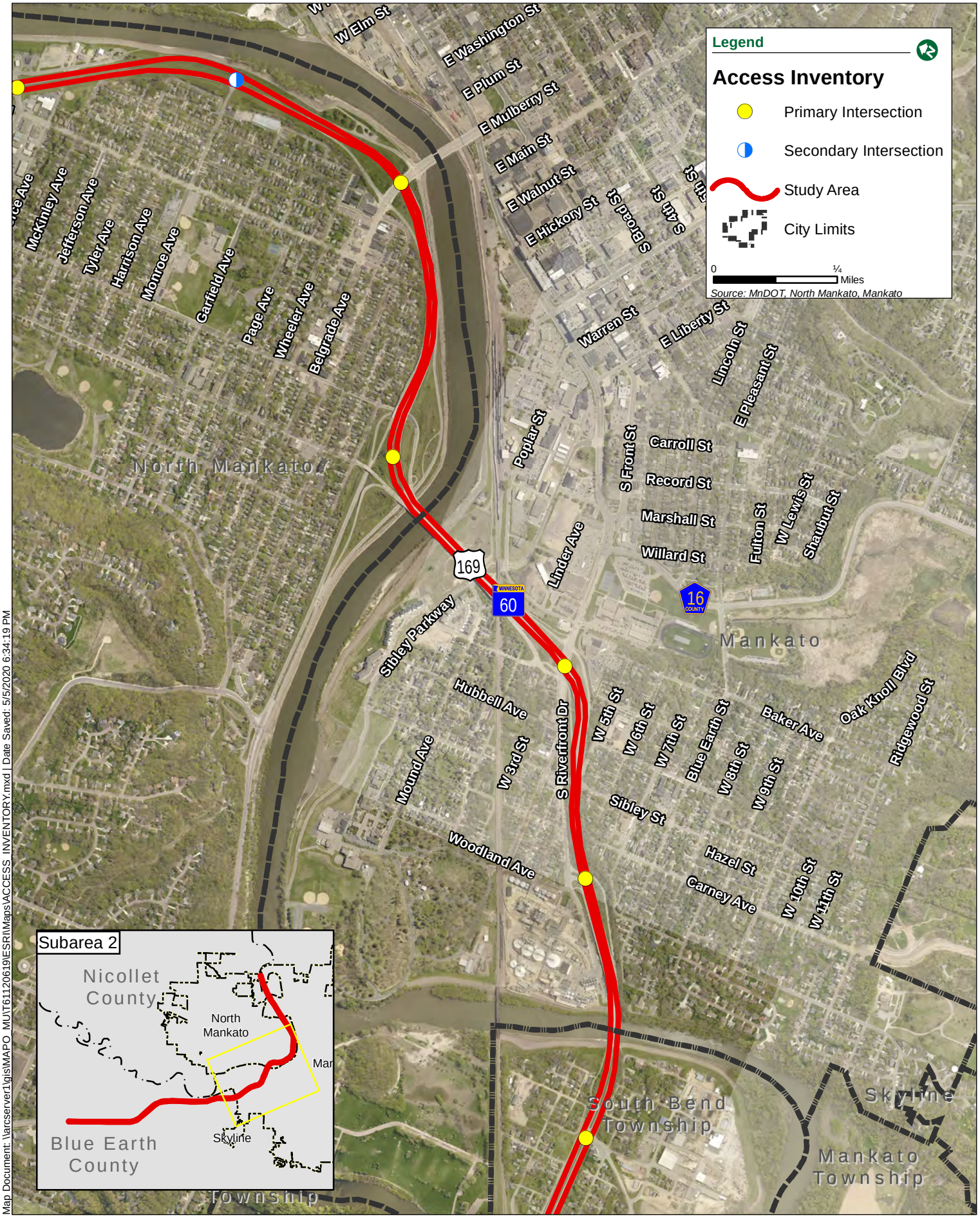
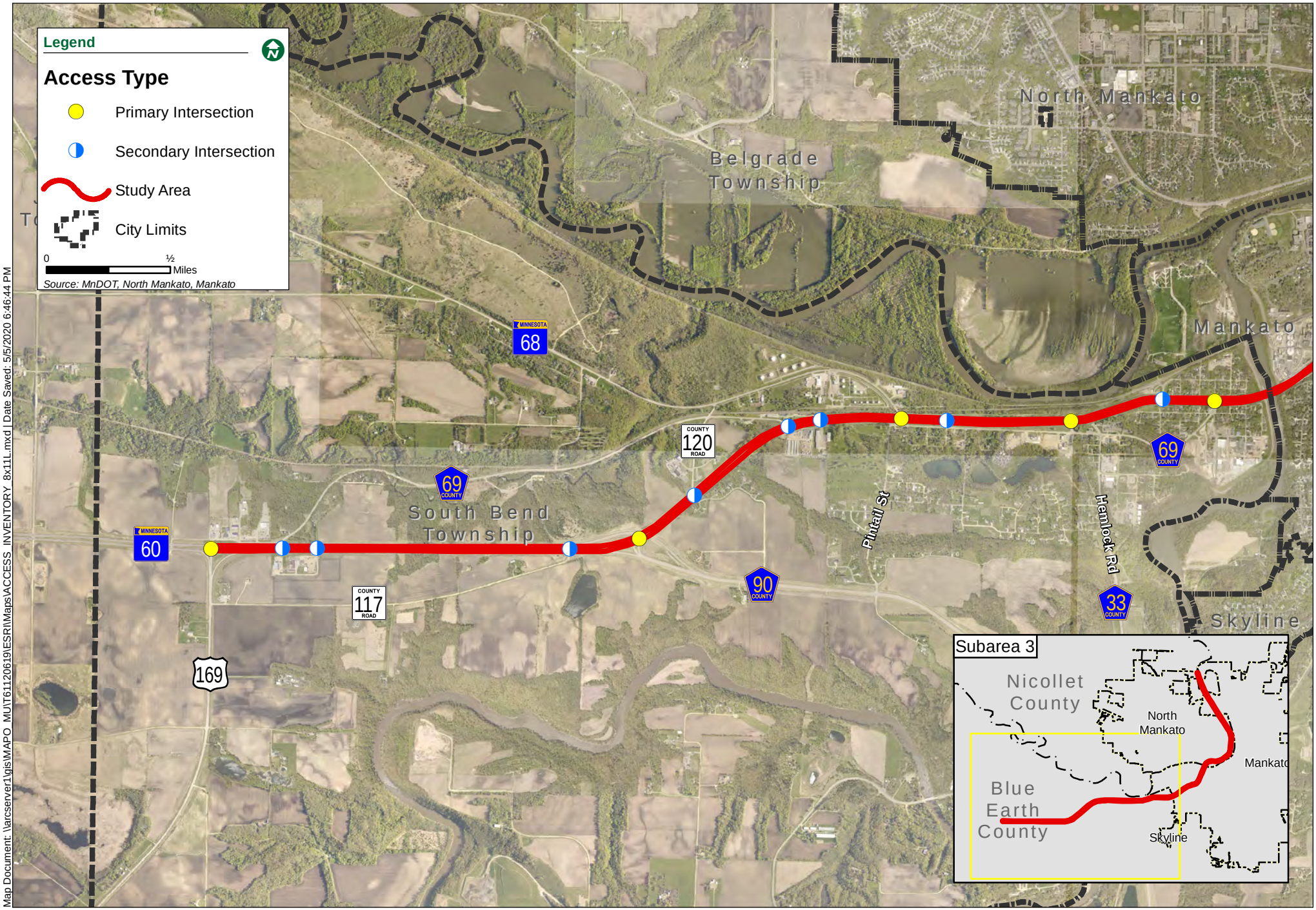


Figure 20 Subarea 3 - ACCESS INVENTORY

May 2020



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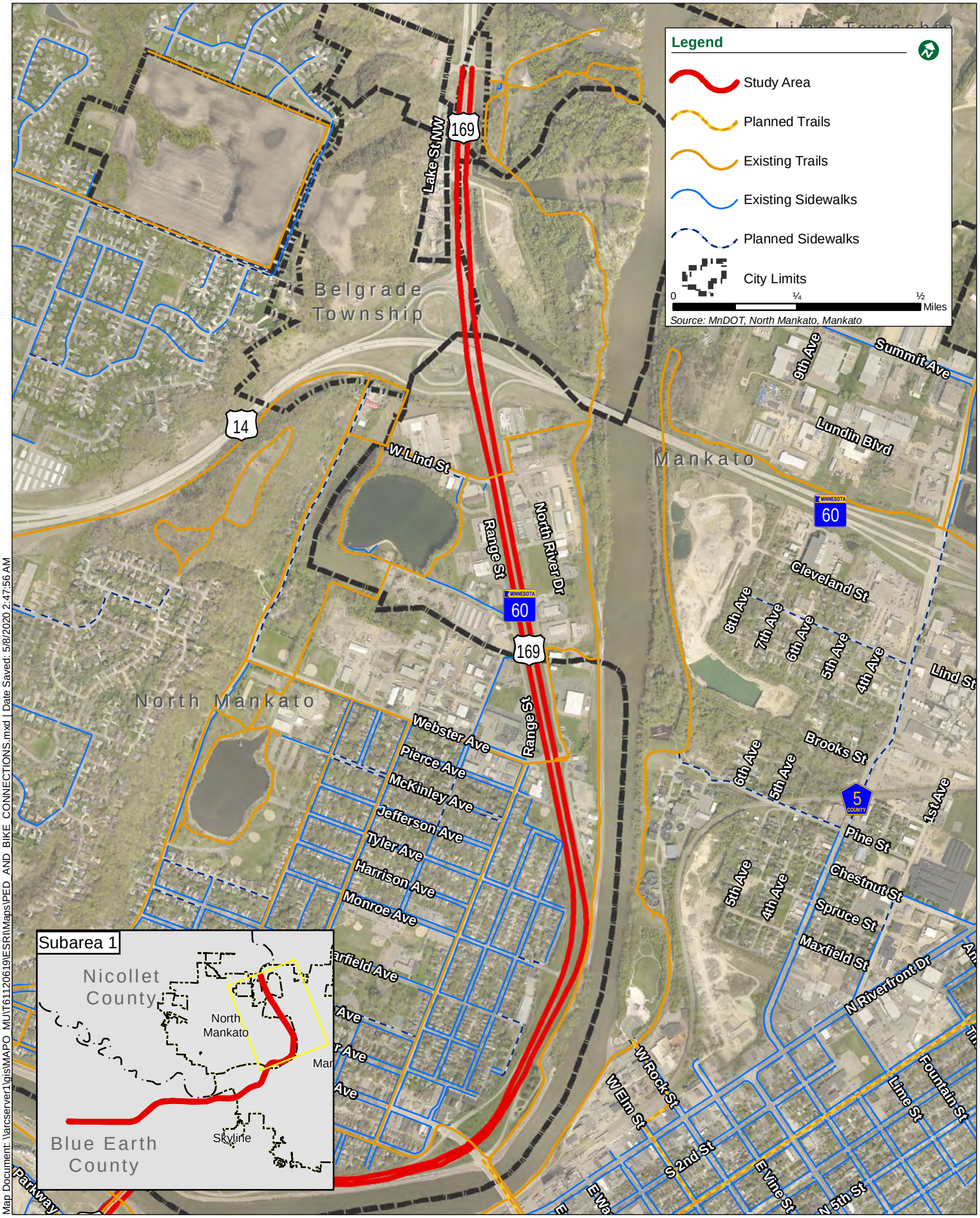

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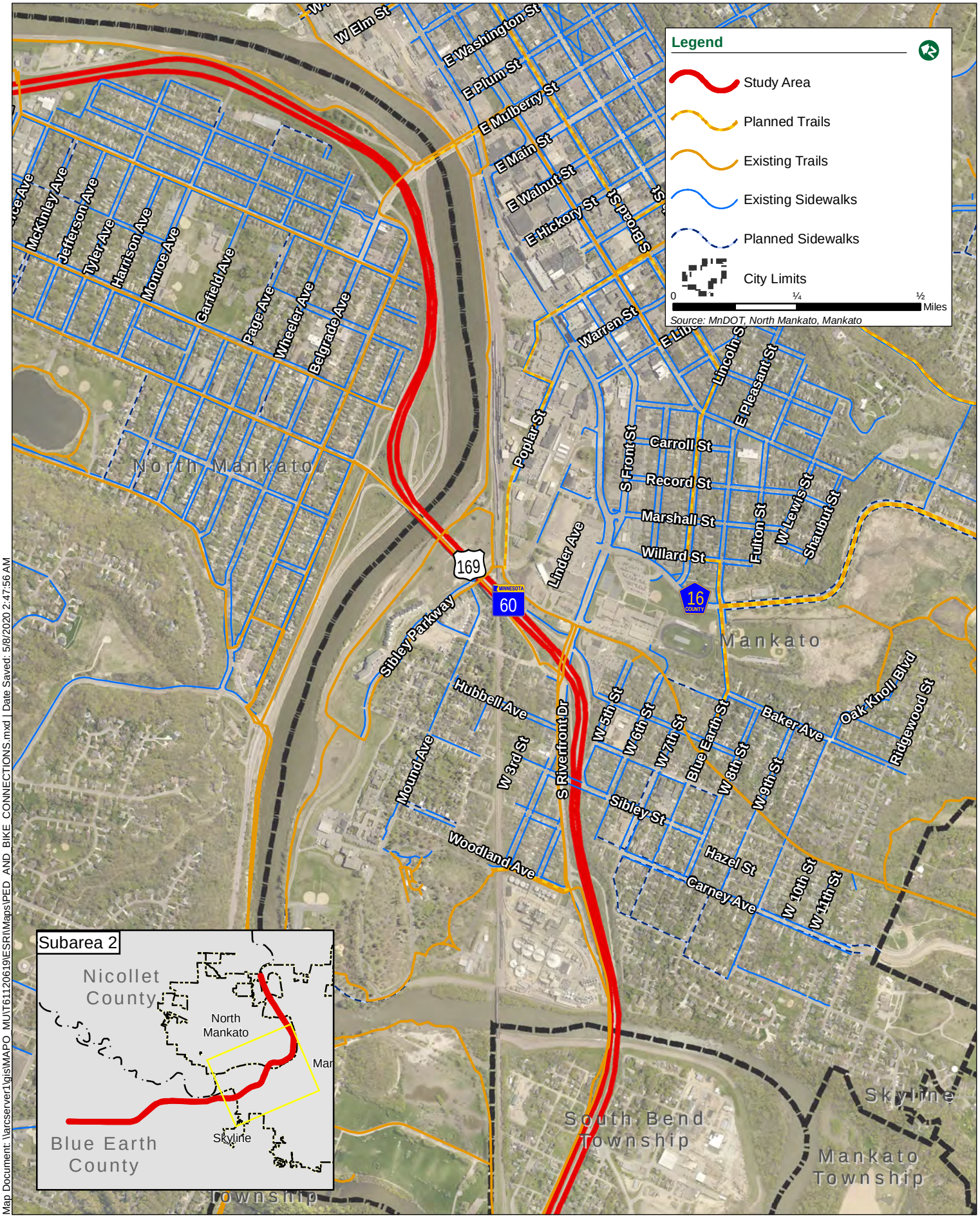

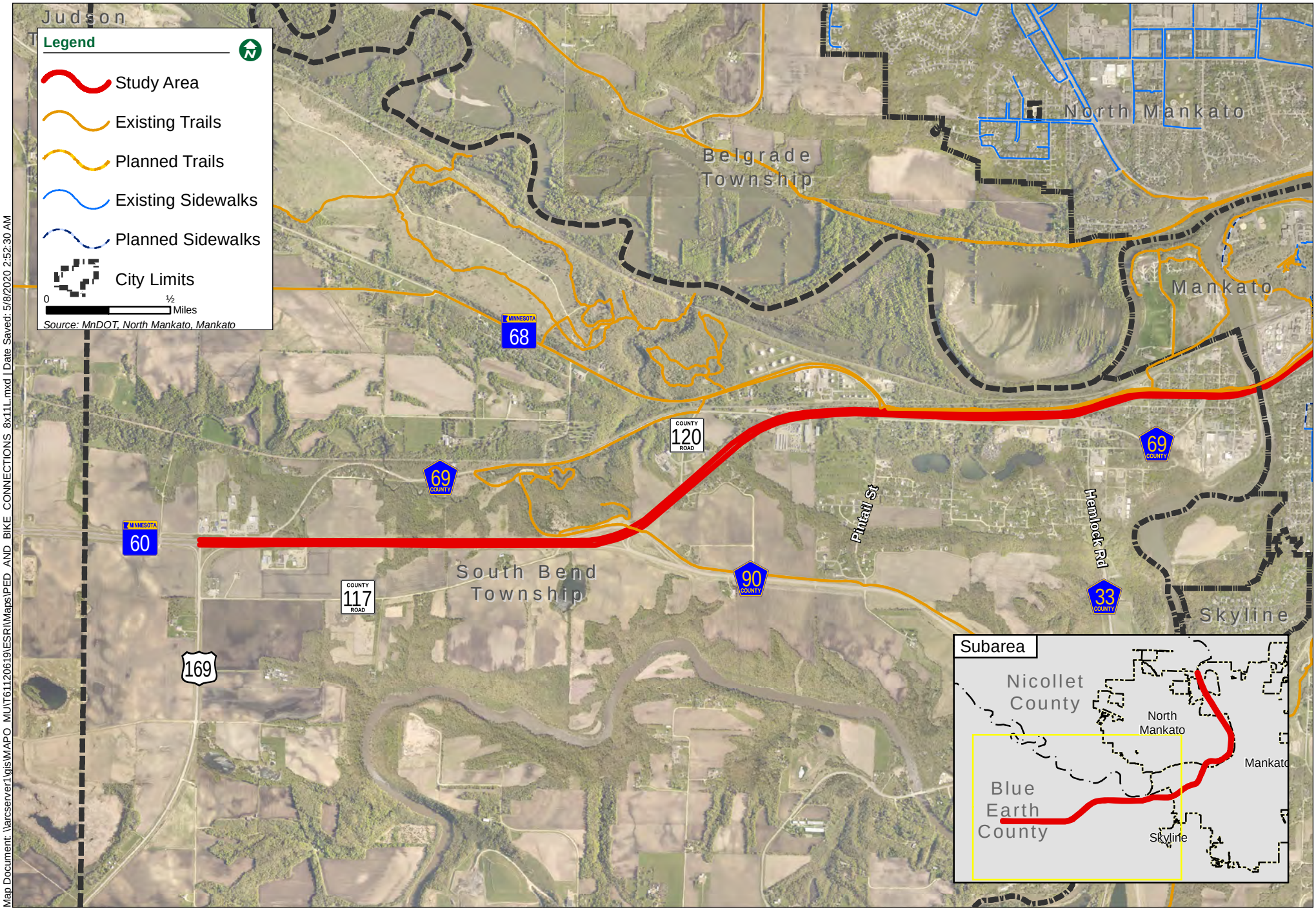

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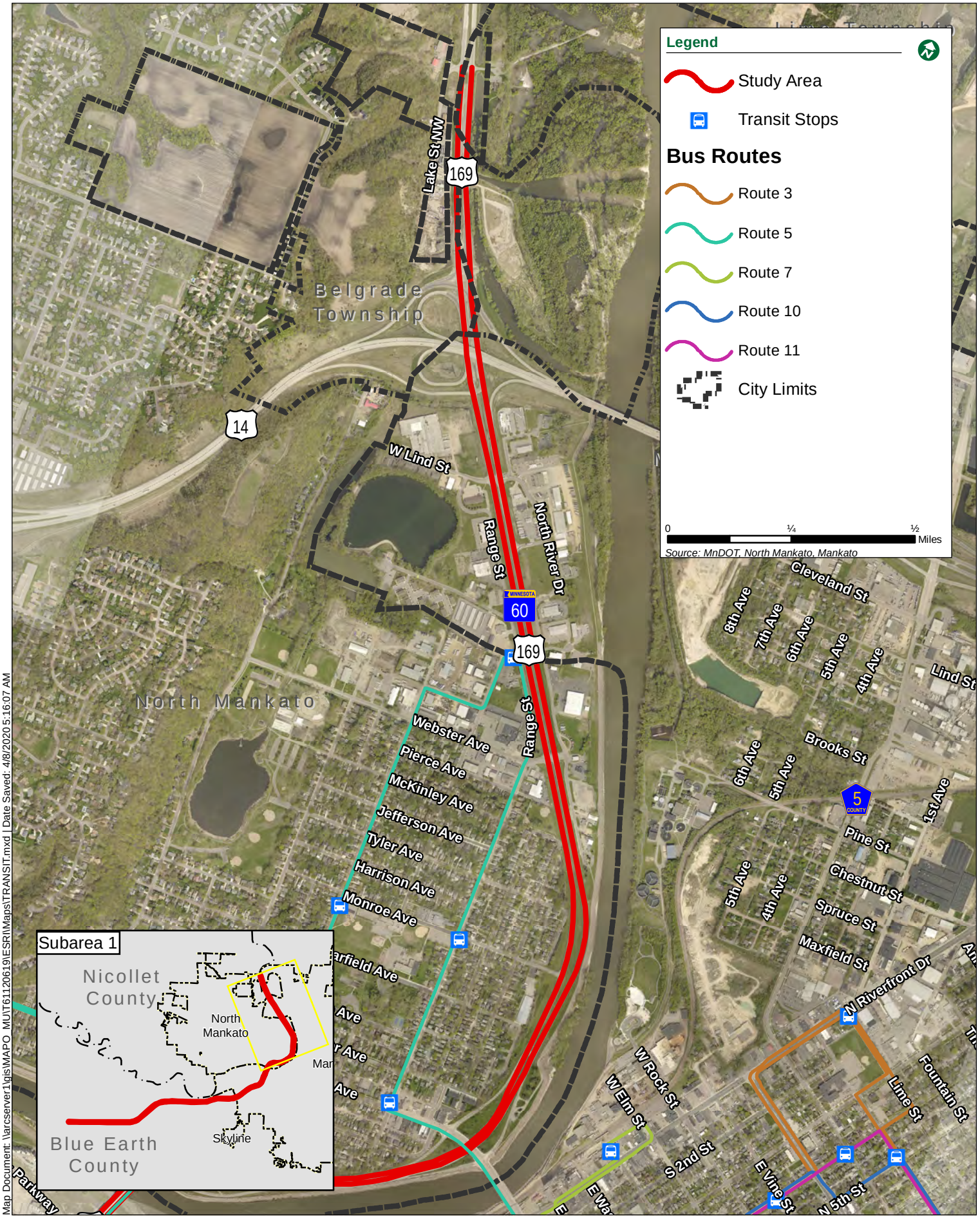

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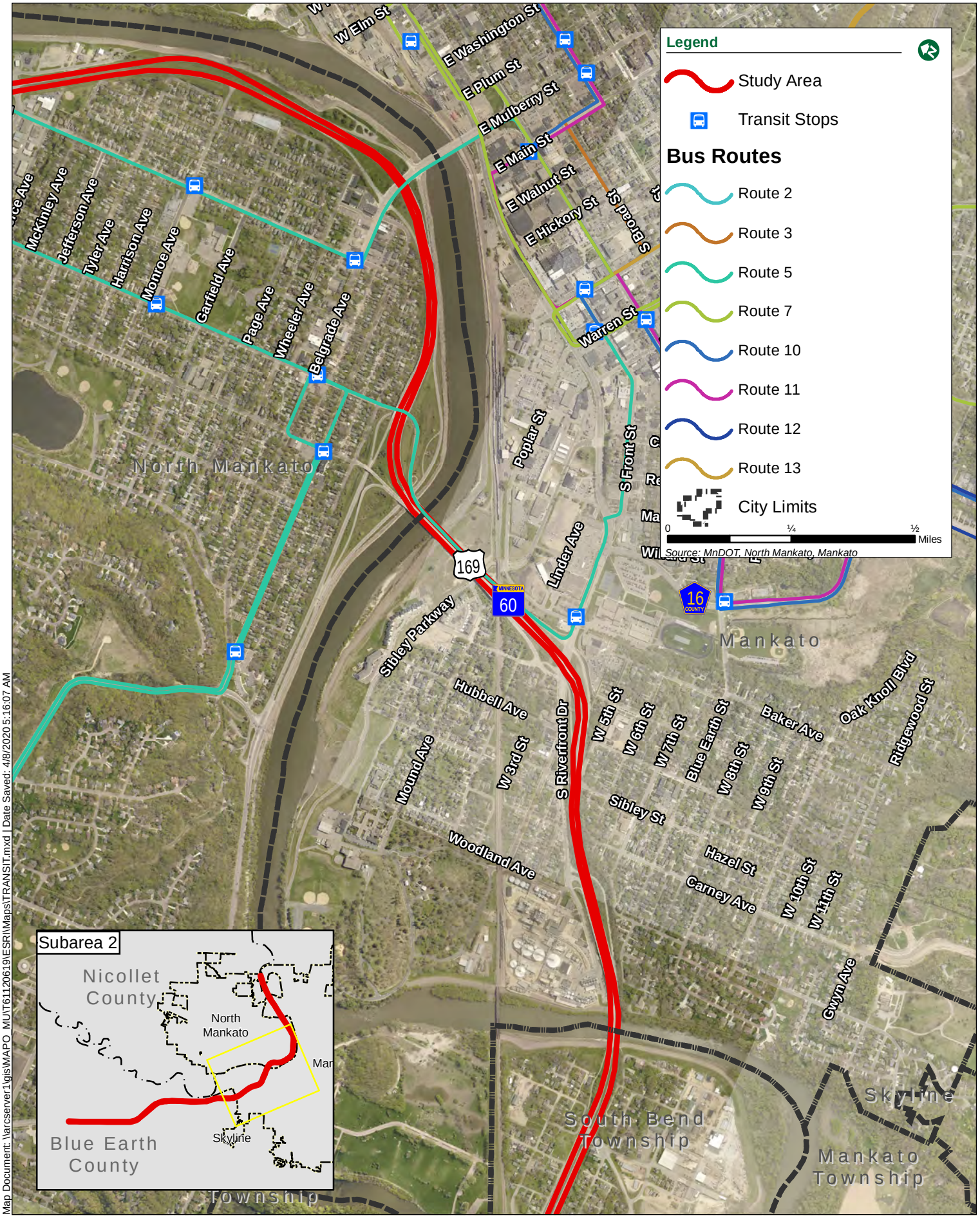

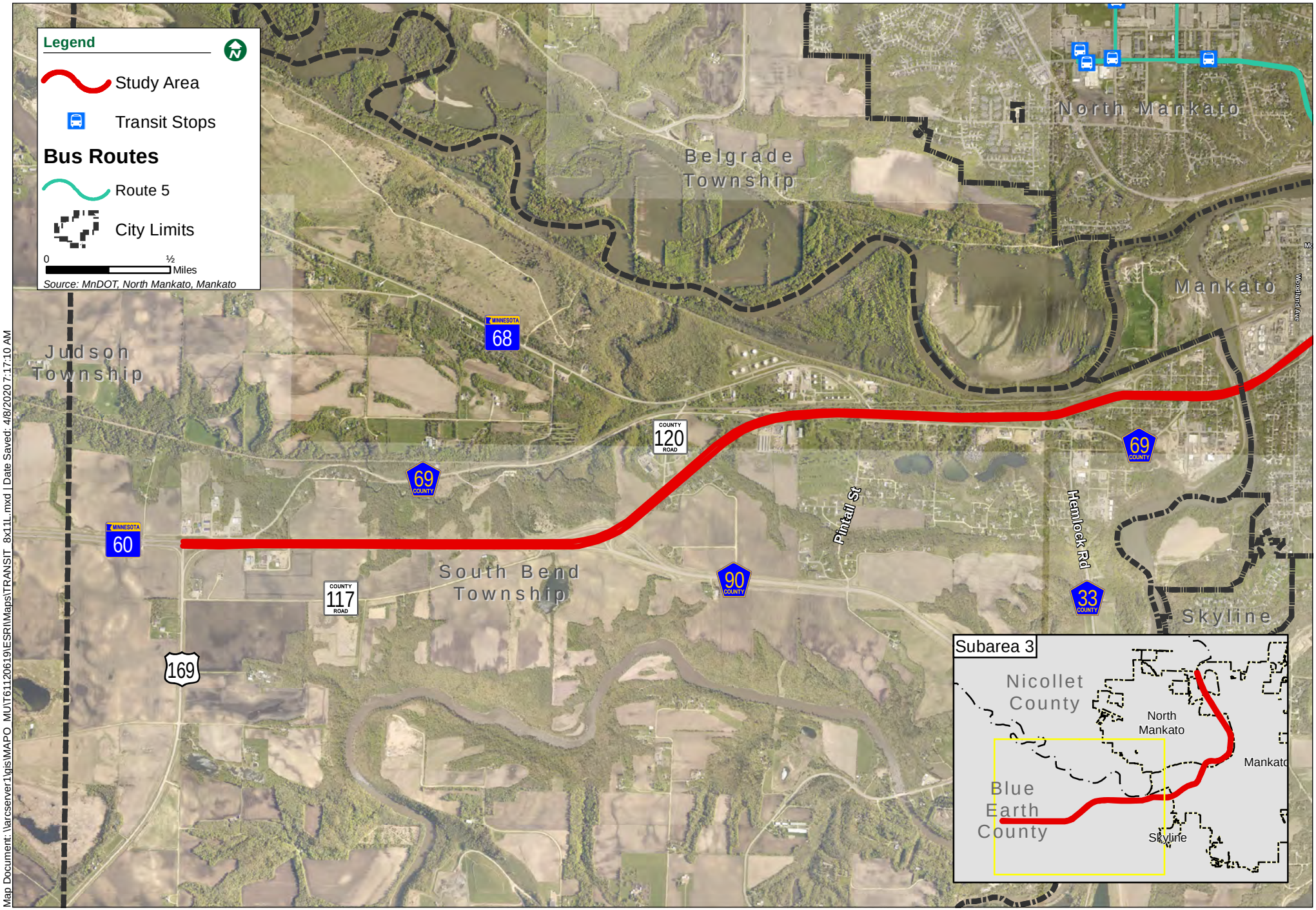

Existing & No-Build Conditions Appendix B: Environmental Justice Analysis

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

BOLTON & MENK
Real People. Real Solutions.

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MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Final Environnemental Justice Analysis

Date: June 8, 2020

To: Charles Androsky, Transportation Planner, MAPO

From: Dan Edgerton, Principal, Zan Associates

Subject: *Environmental Justice Analysis*

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO)

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Figures

I. Background

Executive Order 12898 (1994), *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, must be addressed if impacts result in an adverse and disproportionately high impact on minority or low-income communities. Minority and low-income populations are "readily identifiable groups...who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons...who will be similarly affected by a proposed DOT program, policy or activity" (U.S. DOT, 2012).

Environmental justice populations are minority and/or low-income populations that are meaningfully greater than those of the general population. "Meaningfully greater" for environmental justice populations is generally defined as one where the minority or low-income population is either 10 percent higher than the county average, or greater than 50 percent of the total geographic unit, or determined based on input from local officials or stakeholders (FHWA Office of Human Environment, 2012).

In addition to minority and low-income populations, the EPA also uses education, language, and age demographic indicators to determine a community's potential susceptibility to environmental impacts associated with construction activities. In addition to these indicators, this analysis also looks at housing indicators to determine susceptibility to environmental impacts.

II. Demographics

A. Overview

The Hwy 169 corridor is located in Blue Earth and Nicollet Counties in Minnesota. The two counties combine for a population of 99,244 (Table 1). The corridor study area consists of census block groups that either fall significantly within 0.5 miles of the Hwy 169 project corridor or is a key location just outside the 0.5-mile radius. There are 21 block groups in the Hwy 169 analysis area which have a population of 30,797 people according to the 2017 American Community Survey 5-year Estimates (2017) (Table 1).

Table 1: Environmental justice populations in Hwy 169 project area

		Hwy 169 Project Area		Nicollet and Blue Earth Counties, MN	
		Count	Percent	Count	Percent
Race and ethnicity	**Population**	30,797	—	99,244	—
	White	27,691	90%	88,457	89%
	Minority population	3,548	12%	12,729	13%
	Hispanic or Latino	822	3%	3,562	4%
	African American	1,149	4%	3,141	3%
	Asian or Pacific Islander	442	1%	1,954	2%
	Two or more races	555	2%	1,806	2%
	Native American	66	0.2%	245	0.2%
	Some other race	72	0.2%	79	0.1%
Income	**Population for whom poverty status is determined**	30,420	—	93,466	—
	Income below 200% of the poverty level	8,510	28%	14,835	16%
Education	**25 years and older**	20,386	—	59,878	—
	Less than high school education	941	5%	3,525	6%
Language	**5 years and older**	28,781	—	93,641	—
	Speak English less than "very well"	387	1.3%	1,719	2%
	Speak Spanish	31	0.1%	705	0.8%
	Speak and other language	282	1%	466	0.5%
	Speak an Asian language	73	0.3%	457	0.5%
	Speak an Indo European language	1	0%	91	0.1%
Age	**Population**	30,797	—	99,244	—
	Under 5 years	2,016	7%	5,603	6%
	65 years and older	4,205	14%	13,384	13%
Housing	**Households**	12,729	—	38,220	—
	Owner occupied households	8,472	67%	25,066	66%
	Renter occupied households	4,257	33%	13,154	34%
Disability	**Population for whom disability status is determined**	35,555*	—	98,443	—
	Population with a disability	3,792*	11%	10,240	10%
Vehicles	**Households**	5,042*	—	38,220	—
	No vehicle households	539*	11%	2,654	7%

**Data from census tracts. All other data is from the block group level.*

B. Minority Populations

Minority populations includes individuals who identify as Hispanic or Latino, Black or African American, Asian American or Pacific Islander, Native American, some other race, or two or more races, as defined by the U.S. Census Bureau. A minority population is considered an environmental justice population for this analysis if a block group in the study area contains a minority population that is 10 percent higher than the Blue Earth and Nicollet County's overall minority population. Since 13 percent of Blue Earth's and Nicollet's

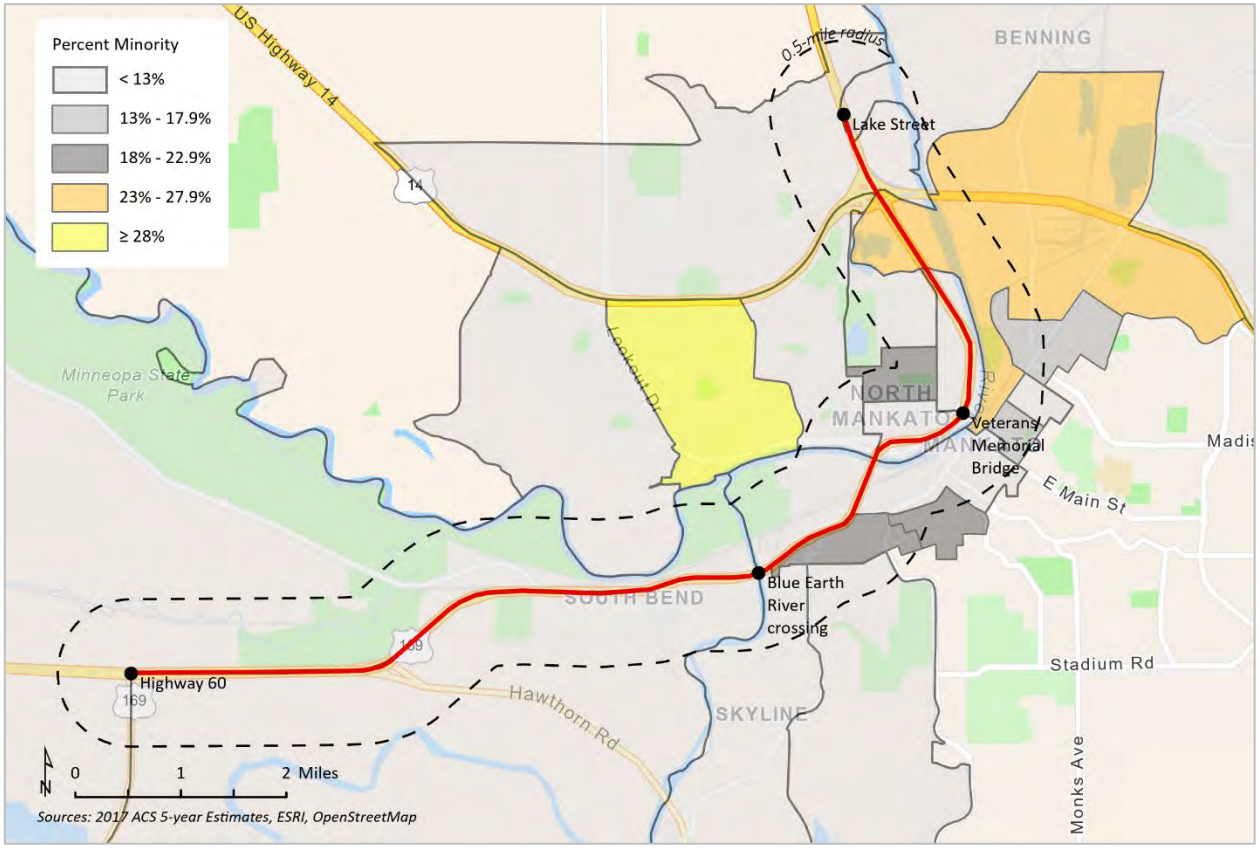
populations are considered minorities, we are interested in block groups in the Hwy 169 study area that have 23 percent or greater minority populations.

There are two block groups above 23 percent minority populations that fall within the project area (Figure 1). Due to the significantly greater minority population compared to the general population than the counties, both of these block groups can be considered environmental justice populations.

The yellow block group north of the Minnesota River has the highest concentration of minority individuals in project area with 34 percent (Figure 1). The block group contains a number of large multi-unit dwellings as well as several other smaller multi-unit dwellings and single-family homes. The orange block group that crosses the segment between Lake Street and Veterans Memorial bridge south of Hwy 14 has mostly businesses west of the Minnesota River, with the notable exception of the townhomes south of Hiniker Pond.

To reach minority populations, staff could contact the Mankato Islamic Center (329 N Broad St) or Dar Abi Bakr Islamic Center (329 E Plum St) to conduct a listening session with the community leaders.

Figure 1: Percent of minority individuals by block group in the Hwy 169 project area



C. Low-Income Populations

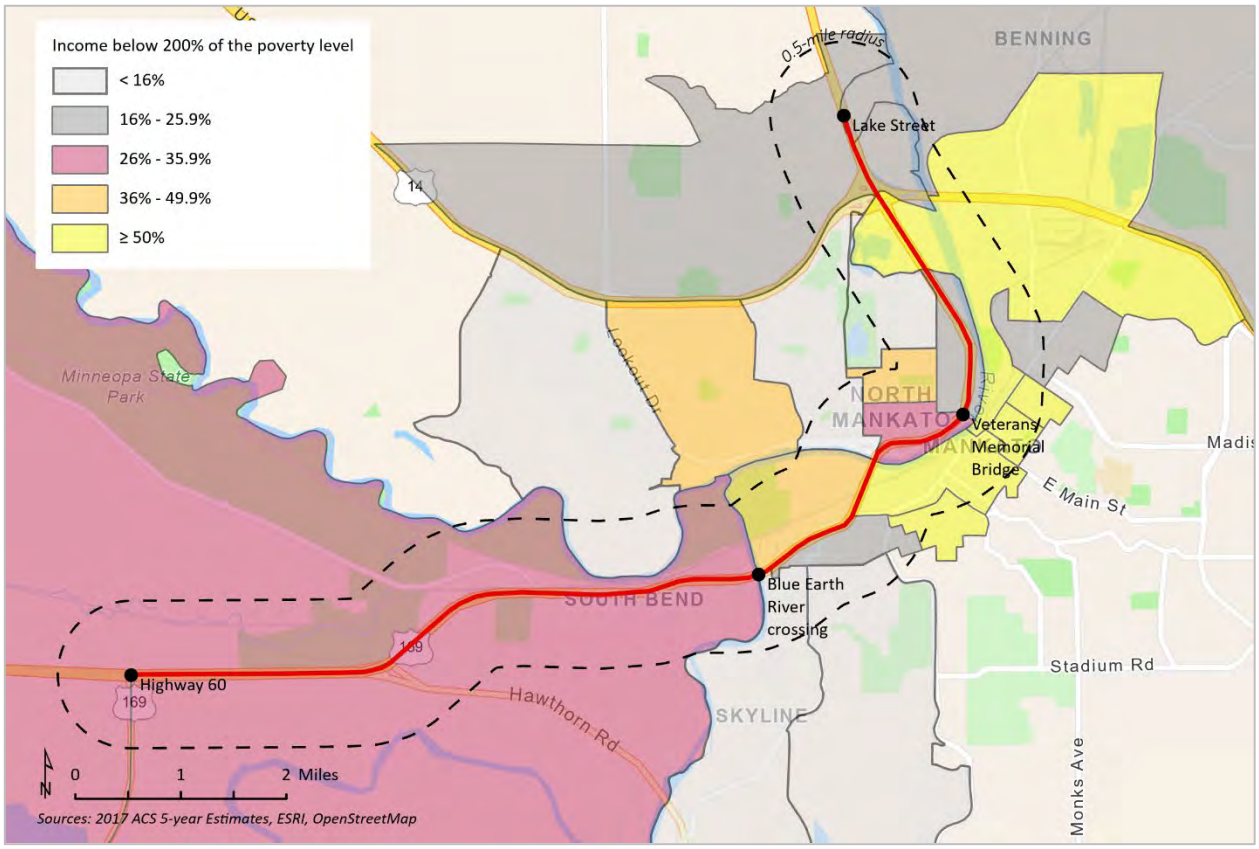
Low income is approximated by census reporting of individuals with income below 200 percent of the poverty level. A low-income population is defined as one where the block group contains a 10 percent

higher concentration of low-income individuals than the county average. Since 16 percent of Blue Earth's and Nicollet's overall populations are considered low income, we are interested in block groups in the Hwy 169 study area that have 26 percent or greater low-income populations.

There are 11 block groups above 26 percent low-income populations that fall within the project area (Figure 2). The block groups range between 26 percent and 70 percent of populations that have low incomes. Due to the significantly greater low-income concentrations compared to the general population than the counties, all 11 block groups can be considered environmental justice populations.

To reach low-income populations in the study area, staff could set-up a table at a food shelf like the Echo Food Shelf (1014 S Front St) or attend a community dinner at one of the many churches near Hwy 169.

Figure 2: Percent of low-income individuals by block group in the Hwy 169 project area



D. Education

About 5% of the population aged 25 years or older living in the study area has less than a high school education compared to 6% for the overall populations of Nicollet and Blue Earth Counties (Table 1). Staff will need to work with locals to identify how to best reach these populations that live near the project area.

E. Language

About 1% of the population living in the study area speaks a language other than English and speaks English less than "very well" compared to 2% for the overall populations of Nicollet and Blue Earth Counties (Table 1). Of those who speak English less than very well, most speak a language not identified in the ACS 5-year estimates (an "Other" language). Staff will need to work with locals to identify which languages are spoken in the area and may be able to engage with people through English as a Second Language programs through Mankato's Adult Basic Education or through Minnesota State University's Center for English Language Programs.

F. Age

About 7% of the population living in the study area is under 5 years old compared to 6% for the overall populations of Nicollet and Blue Earth Counties (Table 1). In addition to working with locals to identify how to best reach families with young children that live near the project area, staff could work with nearby daycares to like the Tip Top Tots Daycare or early childhood education centers like the Mankato Early Learning Center.

About 14% of the population living in the study area is 65 years and over compared to 13% for the overall populations of Nicollet and Blue Earth Counties (Table 1). Staff could work with assisted living homes like Oak Terrace Assisted Living (1575 Hoover Dr) to reach older adults.

G. Housing

In addition to the demographic indicators used by the EPA, project staff are interested in understanding where renters in the area live. About 33% of the housing in the study area is renter occupied compared to 34% of the occupied housing in Nicollet and Blue Earth Counties (Table 1). Staff should focus on engaging with people in multi-unit rental housing to reach renters for the project.

The neighborhood north of where the Blue Earth River meets the Minnesota River has a high concentration of minority and low-income individuals and contains a number of large multi-unit housing including the Villa Terrace Apartments (1560 Tower Blvd), Hoover Estates Apartments (1866 Lee Blvd), Lee Estates Apartments (1740 Lee Blvd), Roe Crest Estate Apartments (1604 Roe Crest Dr), Colony Apartments (1621 Colony Ct), Allen Avenue Apartments (301 Allan Ave), and Village Court Apartments (1620 Village Ct), as well as several other smaller multi-unit buildings and single family units.

The area directly surrounding the Hwy 14 intersection contains mostly businesses and the Kiwanis Recreation Area, with the notable exception of the Park Place Townhomes just south of Hiniker Pond (281 Butterworth St).

H. Disability

Although not an EJ population, it is important to be aware of the people with disabilities in the project area. About 11% of the population for whom disability status is determined has a disability in the project area

compared to 10% for the overall populations of Nicollet and Blue Earth Counties (Table 1). Staff will need to work with locals to identify how to best reach these populations that live near the project area.

I. Households Without a Vehicle

Although not an EJ population, it is also important to be aware of the number of households in the project area without a vehicle. About 11% of households in the project area do not have a vehicle compared to 7% for the overall households in Nicollet and Blue Earth Counties (Table 1). Staff will need to work with locals to identify how to best reach these households that live near the project area.

III. Findings

Since there are environmental justice populations located in the Hwy 169 corridor, these populations have the potential to experience disproportional impacts should impacts during construction activities along the corridor happen to be limited to the area where the environmental justice populations are located. However, permanent impacts of projects along the corridor are intended to improve the transportation corridor for all users. Although the anticipated improvements to the Hwy 169 corridor would unlikely disproportionately impact the identified environmental justice populations, a robust public engagement effort is strongly recommended.

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Existing & No-Build Conditions Appendix C: Environmental Screening

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Highway 169 Corridor Study

Final Environmental Screening

Date: June 8, 2020

To: Charles Androsky, Transportation Planner, MAPO

From: Dan Edgerton, Principal, Zan Associates

Subject: *Environmental Screening Summary*

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO)

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Figures

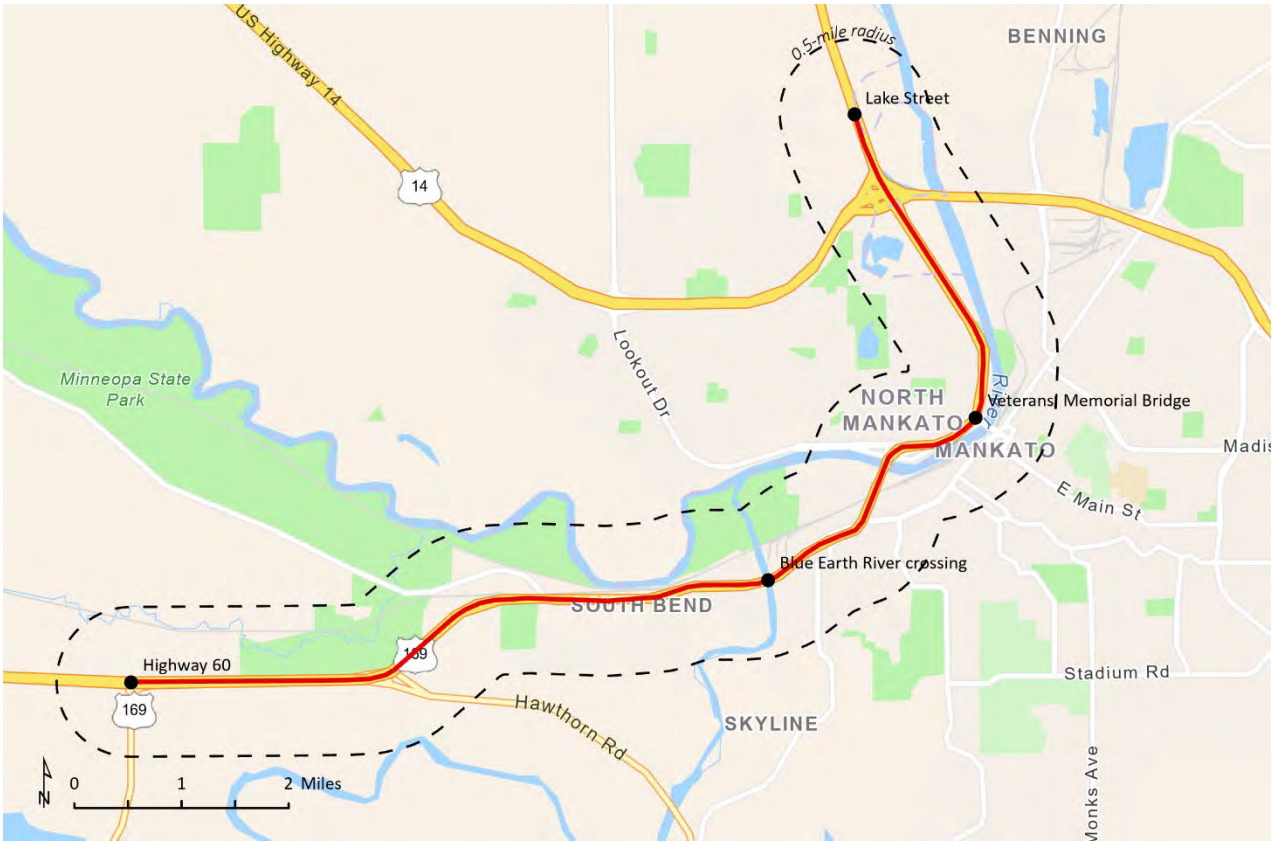
I. Introduction

This is a preliminary screening of the potential environmental impacts within the footprint of the Highway 169 corridor project. The purpose of this document is to identify potentially sensitive areas by considering all National Environmental Policy Act (NEPA) protected social, economic, and environmental categories. This screening will be used as a primer for required NEPA and state environmental reviews later in the project, and will be used to inform and evaluate corridor alternatives. This document does not accommodate the necessary NEPA process or state environmental review process, which would occur once a project becomes funded.

II. Project Area

Figure 1 shows the study area which includes Highway 169 from the northern Mankato city limits (Lake Street NW) to its intersection with Trunk Highway 60 and Highway 169 turning south at the western extents of South Bend township. Landscaping features along the highway are sparse and limited with grass medians and roadside features typically being grass with a few sporadic trees.

Figure 1: Project area



For ease in describing key corridor characteristics in more depth, the corridor is split into three subareas based on the unique context within each.

Northern Subarea - The northern subarea runs from the Veterans Memorial Bridge to Lake Street. This segment is a four-lane divided expressway with a speed limit of 50 mph.

Middle Subarea – The middle subarea runs from the Blue Earth River crossing to Veterans Memorial Bridge. This is a four-lane divided freeway corridor with a speed limit of 50 mph.

Southern Subarea – The southern subarea runs from Highway 60 to the Blue Earth River crossing. This is a four-lane divided expressway corridor with a speed limit ranging from 50 to 65 mph.

III. Social, Economic and Environmental Impacts (SEE)

This section describes existing conditions and potential environmental impacts of the Highway 169 project for further investigation as alternatives are developed. The sections are arranged in a format similar to the one used in Minnesota for environmental review of projects in the Environmental Assessment Worksheet (EAW) for incorporation into a future NEPA document, as needed.

A. Cover Types

The project area for the Hwy 169 area, as defined as the 0.5-mile radius around the corridor, includes about 6,000 acres of land in Blue Earth and Nicollet Counties. Land cover data for the area was obtained from the National Land Cover Database. Cover types are listed by acreage in the project area in Table 1.

About half of the land overall is developed land in the project area. A majority of the cover in the Northern subarea and nearly all of the cover in the middle subarea consists of developed land. A little more than one-fourth of the land in the Southern subarea is developed while other large portions of land consist of cropland and wooded area.

Table 1: Existing cover types in the project subareas

Cover Type	Northern Subarea (Acres)	Middle Subarea (Acres)	Southern Subarea (Acres)	TOTAL
Open Water	162	70	132	364
Developed	1,067	1,109	861	3,037
Barren Land (Rock/Sand/Clay)	30	5	207	242
Wooded/forest	102	4	523	629
Grassland	111	8	340	460
Cropland	109	0	673	782
Wetland	117	7	365	489
TOTAL	**1,698**	**1,203**	**3,101**	**6,003**

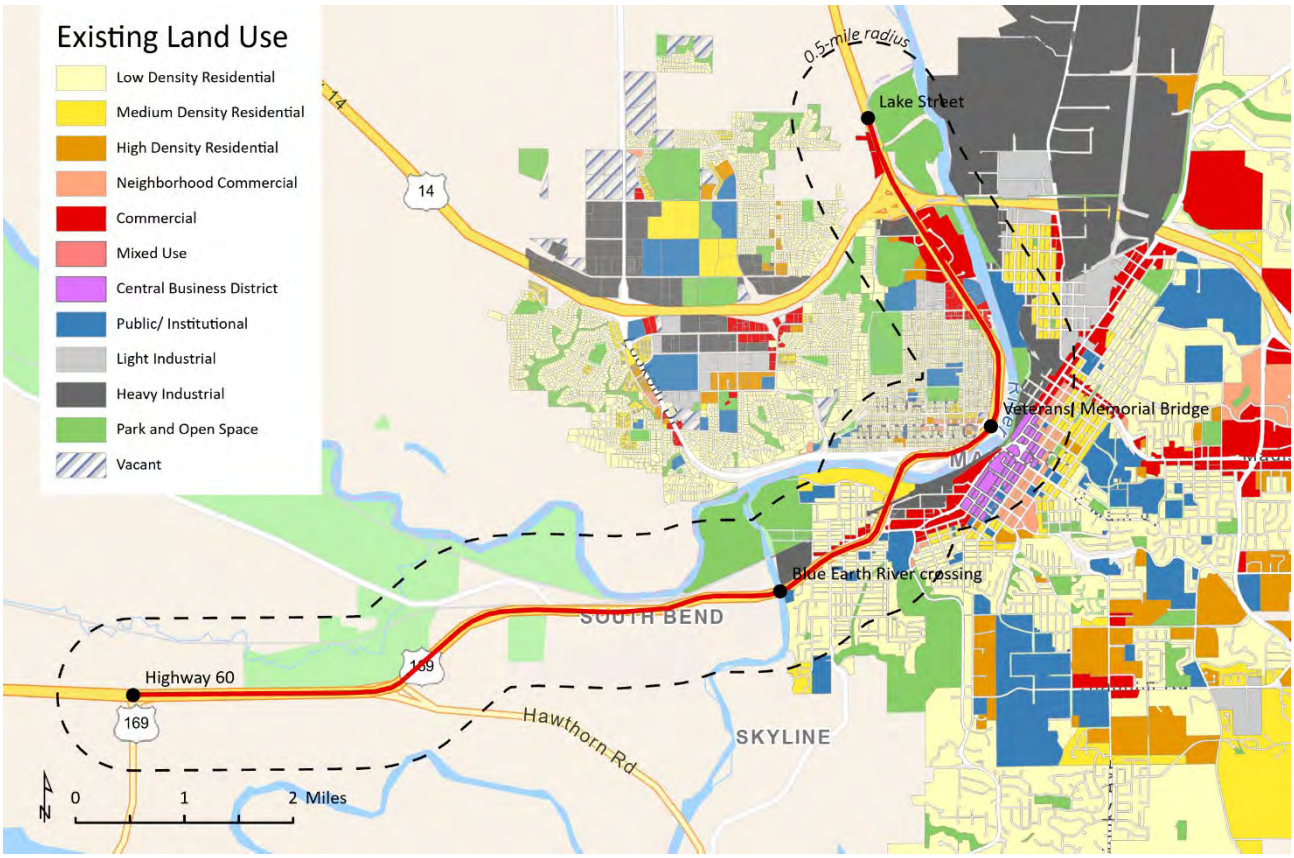
B. Land Use

Existing land uses in the study area are shown in Figures 2 and described below. At the time of this report, the Cities of Mankato and North Mankato were in the process of updating their future land

use plans. The existing conditions report includes a map from the Cities of North Mankato and Mankato's latest Comprehensive Plan update. When each process is complete, the updated future land use plan will be reflected here and in other relevant Highway 169 Study documentation.

There are currently no changes to the land use planned for the South Bend Township and the southern subarea of this study, much of which consists of agriculture and low density development.

Figure 2: Existing land use



Northern Subarea

The northern subarea is within the Cities of Mankato and North Mankato. North of the Highway 169 and Highway 14 is primarily park and open space with some commercial land use. The Kiwanis Recreation Area is a 100-acre regional destination many-featured park including 5-miles of mountain bike trails, cross country ski trails, other trials, dog park, archery range, water access, camping, and a large picnic shelter. South of the Highway 169 and Highway 14 is a large concentration of commercial, heavy industrial, light industrial, residential, and public/institutional land uses served by Lind Street and Webster Avenue connections to Highway 169. This concentration of commercial and industrial land use is a major local and regional traffic generator served by its direct access to Highway 169 and proximity and ease of access to the Highway 169 and Highway 14 interchange. This area also includes high-density residential near Hiniker Pond

with access off Lind Street and access to residential neighborhoods, parks and schools in Lower North Mankato via Webster Avenue.

As Highway 169 moves towards Veterans Memorial Bridge direct access spacing becomes more distant, with the surrounding land use being dominated by low density residential. Both the North Mankato and Mankato central business districts can be accessed by the Highway 169/Veterans Memorial Bridge.

Middle Subarea

The middle subarea also includes the Cities of Mankato and North Mankato, with the land uses directly adjacent Highway 169 dominated by low and medium density residential and heavy industrial along the eastern edge of the Minnesota River. Other adjacent land uses include high density residential, mixed use, commercial, and public/institutional and North Mankato Fire Station #1 has access to Highway 169 via Lookout Drive.

As the only full freeway segment there is no direct access, traffic movements rely heavily on the Veterans Memorial Bridge, Lookout Drive, and South Riverfront Drive interchanges. These interchanges also provide critical connections to Downtown Mankato for northbound Highway 169 travelers, in addition to the local roadway network in this area for access to West Mankato, southern Mankato and Minnesota State University, Mankato campus, lower and upper North Mankato, and across the Minnesota and Blue Earth Rivers. This subarea also provides the only two connections across the Minnesota River at the Veterans Memorial Bridge and the Northstar Bridge for access between communities.

Southern Subarea

The southern subarea is located in South Bend Township and includes primarily agriculture, low density residential and park and open space land uses directly adjacent Highway 169, with sparse areas of commercial and light industrial.

Connectivity of the local roadway network is inhibited in many areas by topography, including steep slopes and natural areas, the Union Pacific Railroad, the Minnesota and Blue Earth Rivers and adjacent land uses. Limited local network connectivity put pressure on Highway 169 and conversely, any change in access will put pressure on the local system.

C. Geology, Soils and Topography/Land Forms

Elevations range from 774 feet at the Highway 169 intersection at TH 60 to 994 feet at the Highway 169 and Lake Street intersection, an elevation change of 200 feet.

Soil data were obtained from the NRCS Web Soil Survey for Blue Earth and Nicollet Counties. Table 2 lists the 60 different soils present by acreages in the project area, organized by the overall acres for the entire project area. This information will be used to assess various soil limitations such as hydric characteristics and the limitations for local roads and streets.

Table 2: Soil survey for Blue Earth and Nicollet Counties

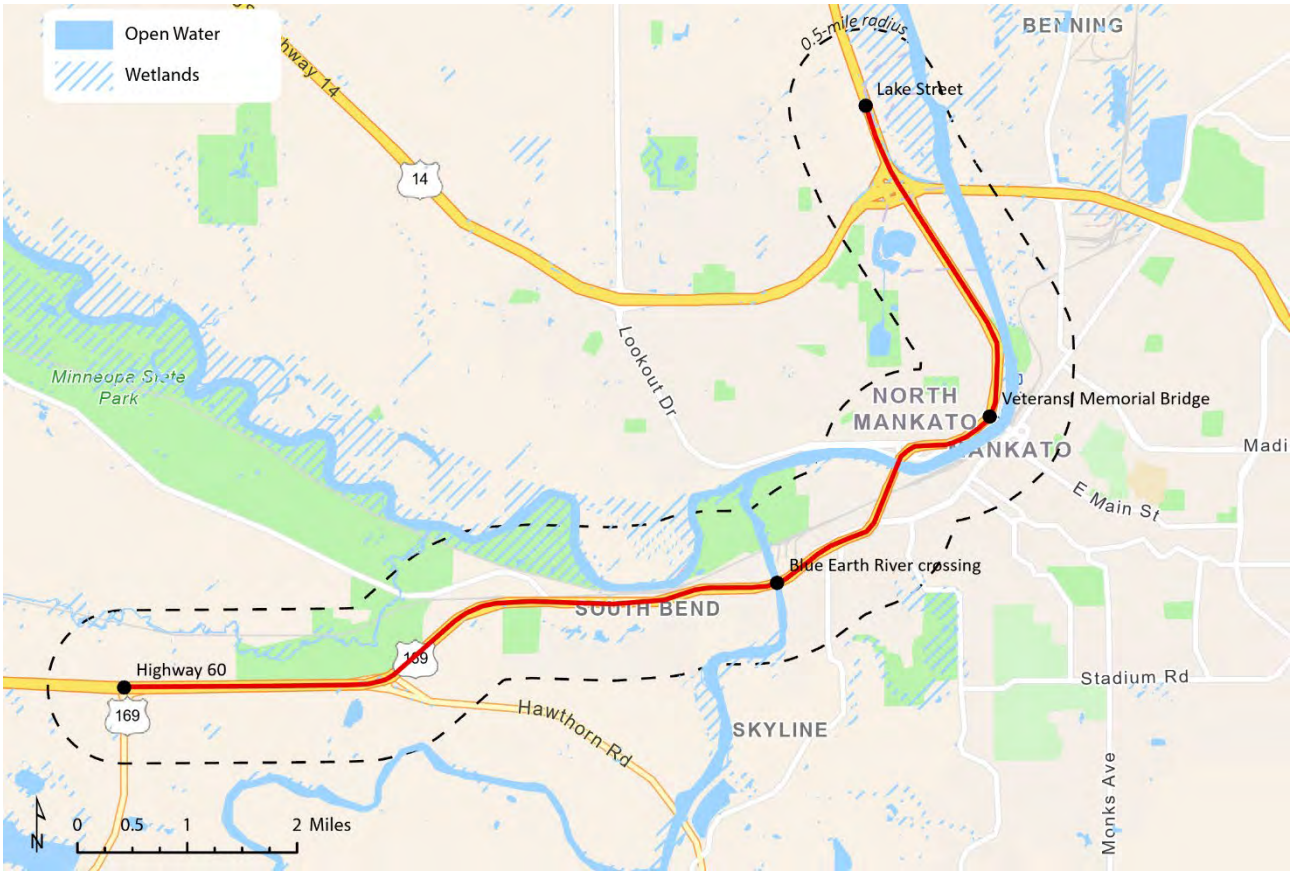
Name	Northern Subarea (Acres)	Middle Subarea (Acres)	Southern Subarea (Acres)	TOTAL
Chaska-Urban land complex	537	291	0	829
Alluvial land	179	56	291	527
Alluvial-Urban land complex	104	233	97	434
Storden complex	0	11	250	261
Urban land	19	121	109	249
Rock outcrop-Copaston complex	55	26	162	243
Copaston-Rock outcrop complex	75	8	158	241
Water	105	51	68	224
Copaston-Urban land bouldery complex	0	210	0	210
Lasa loamy fine sand	0	0	202	202
Lester-Belview complex	185	6	0	192
Reedslake-Le Sueur complex	24	1	150	176
Copaston loam	8	0	167	175
Marna silty clay loam	0	0	154	154
Le Sueur loam	23	0	127	150
Terril loam	40	1	106	147
Copaston-Urban land complex	112	33	1	146
Chaska loam	26	0	107	133
Kilkenny clay loam	0	0	125	125
Clarion loam	0	0	124	124
Dorchester-Urban land complex	4	95	0	99
Webster clay loam	0	0	78	78
Lester loam	0	0	75	75
Minneiska-Kalmarville complex	26	0	44	70
Minneiska sandy loam	11	0	47	58
Grogan silt loam	0	0	54	54
Cordova clay loam	38	0	11	49
Millington clay loam	0	0	43	43
Dorchester loam	42	0	0	42
Oshawa silt loam	39	0	0	39
Hamel loam	0	0	39	39
Wadena loam	0	12	26	38
Calco silty clay loam	16	21	0	37
Estherville sandy loam	0	0	36	36
Shorewood silty clay loam	0	0	35	35
Marsh	0	0	31	31
Terril-Urban land complex	3	25	0	28

Name	Northern Subarea (Acres)	Middle Subarea (Acres)	Southern Subarea (Acres)	TOTAL
Muskego soils	0	0	28	28
Nicollet clay loam	0	0	27	27
Comfrey clay loam	0	0	21	21
Tilfer silty clay loam	0	0	20	20
Omsrud-Storden complex	0	0	18	18
Le Sueur-Reedslake-Cordova complex	8	0	8	16
Fedji loamy fine sand	0	0	11	11
Barrington silt loam	0	0	8	8
Reedslake-Swanlake complex	0	0	7	7
Cordova-Urban land complex	6	0	0	6
Minneopa loamy fine sand	0	0	6	6
Le Sueur-Urban land complex	6	0	0	6
Grogan loamy fine sand	0	0	5	5
Glencoe silty clay loam	0	0	5	5
Darfur loam	0	0	4	4
Dickinson loam	4	0	0	4
Litchfield loamy fine sand	0	0	4	4
Clarion-Estherville complex	0	0	3	3
Guckeen silty clay loam	0	0	3	3
Klossner muck	0	0	3	3
Glencoe clay loam	0	0	2	2
Canisteo clay loam	0	0	1	1
Minneopa sandy loam	0	0	1	1
TOTAL	**1698**	**1203**	**3101**	**6003**

D. Water Resources

Water resources data from the National Wetlands Inventory shows approximately 935 acres of water resources exist within the 0.5 miles of the project limits and include rivers, ponds and wetlands (Figure 3). Hwy 169 runs to the west of the Minnesota River in the northern subarea and then crosses the River in the middle subarea. The Minnesota River bends outside of the 0.5-mile project area limits in the middle subarea but then bends back to run adjacent to the north of Highway 169 for approximately 0.75 miles in the southern subarea. The Blue Earth River bisects the middle and southern subareas. There are many small unnamed ponds in the areas surrounding the two rivers.

Figure 3: Water resources



Other major water features include Hiniker Pond which lies to the west of Highway 169 in the northern subarea to the southwest of the Highway 169/Highway 14 interchange. There are also two unnamed ponds in the Kiwanis Recreation Area, to the northeast of the Highway 169/Highway 14 interchange.

In addition to the open water features, many of the areas around the rivers and ponds are designated as wetlands, either freshwater emergent or freshwater forested. Table 3 lists the types of water features present within the corridor by acreage.

A locally controlled levee exists within the corridor on the river side of Highway 169 to minimize flooding associated with high water levels in the Minnesota River. The levee is a combination of earthen berm and concrete floodwall that provides flood protection for North Mankato, Mankato, and LeHillier when the River is at flood stage. Until recently, the levee had a gap in protection that existed north of the Highway 169/Highway 14 interchange. A project in 2018 closed this gap in the levee by raising the elevation of Highway 169 just north of the Highway 14 interchange. At this location, Highway 169 and Highway 14 are considered a part of the levee.

Table 3: Water resource types in the project area

Name	Northern Subarea (Acres)	Middle Subarea (Acres)	Southern Subarea (Acres)	TOTAL
River *(Minnesota River, Blue Earth River, Minneopa Creek & all associated backwaters)*	135	75	125	335
Freshwater Pond	42	0	17	59
Freshwater Emergent Wetland	65	11	104	180
Freshwater Forested/Shrub Wetland	161	11	190	362
TOTAL	**403**	**98**	**435**	**935**

**Wetland and Water permits will be coordinated with the US Army Corps of Engineers, Minnesota's Wetland Conservation Act representatives, and the Minnesota Department of Transportation.*

E. Contamination/Hazardous Materials/Wastes

Potentially contaminated site data was obtained from the MPCA's What's in My Neighborhood dataset. There are 479 potentially contaminated sites in the project area (Figure 4).

Figure 4: Potentially contaminated sites

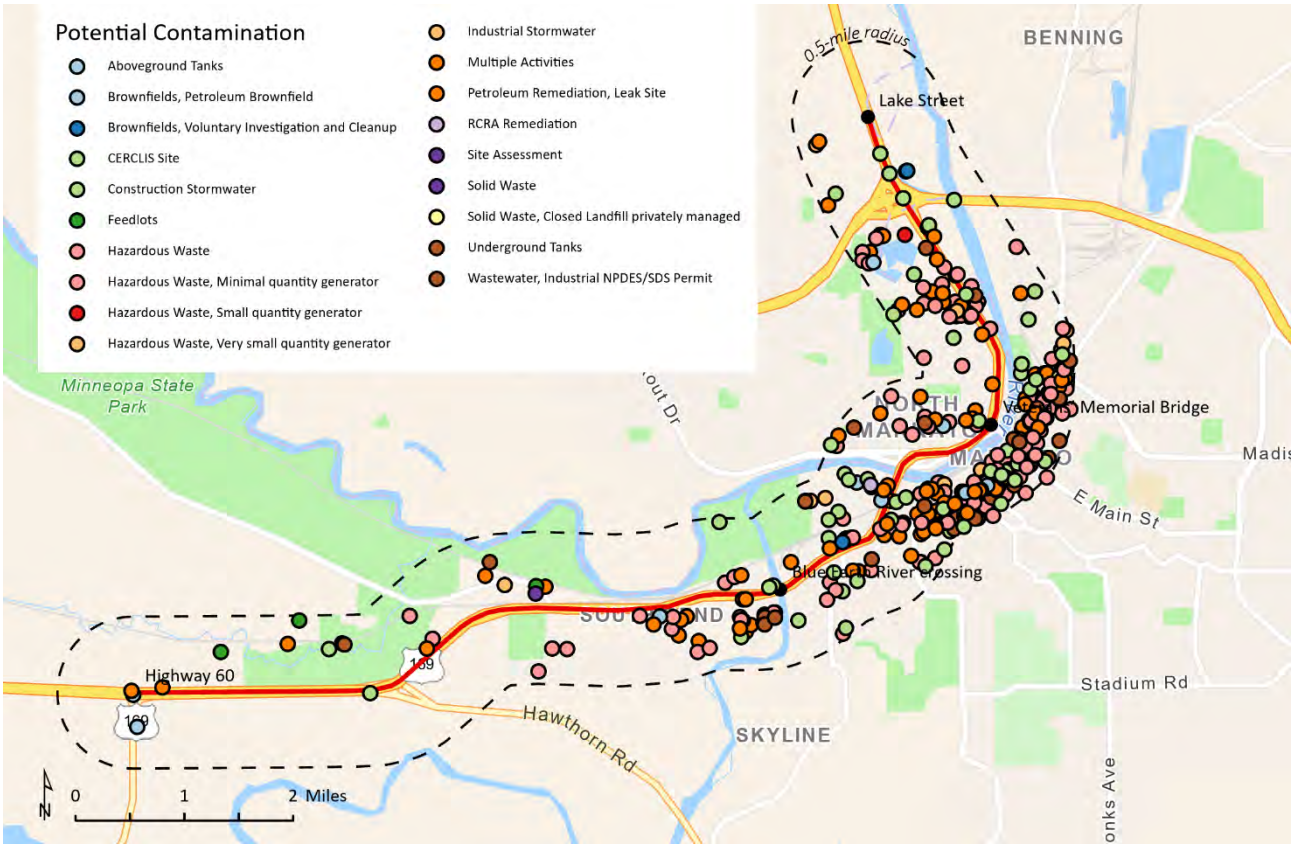


Table 4 lists potentially contaminated sites by activity and subarea, including sites with multiple activities. Potentially contaminated sites include sites with any activity that may lead to toxic or hazardous contamination. There are 156 potentially contaminated sites in the northern subarea, 262 in the middle subarea, and 61 in the southern subarea.

The highest type of activity for potentially contaminated sites in the project area include hazardous waste sites. Hazardous waste is hazardous waste is dangerous or potentially harmful effect on human health or the environment. There are 161 total hazardous waste site throughout the entire project area with 55 hazardous waste sites in the Northern subarea, 87 in the middle subarea, and 19 in the southern subarea.

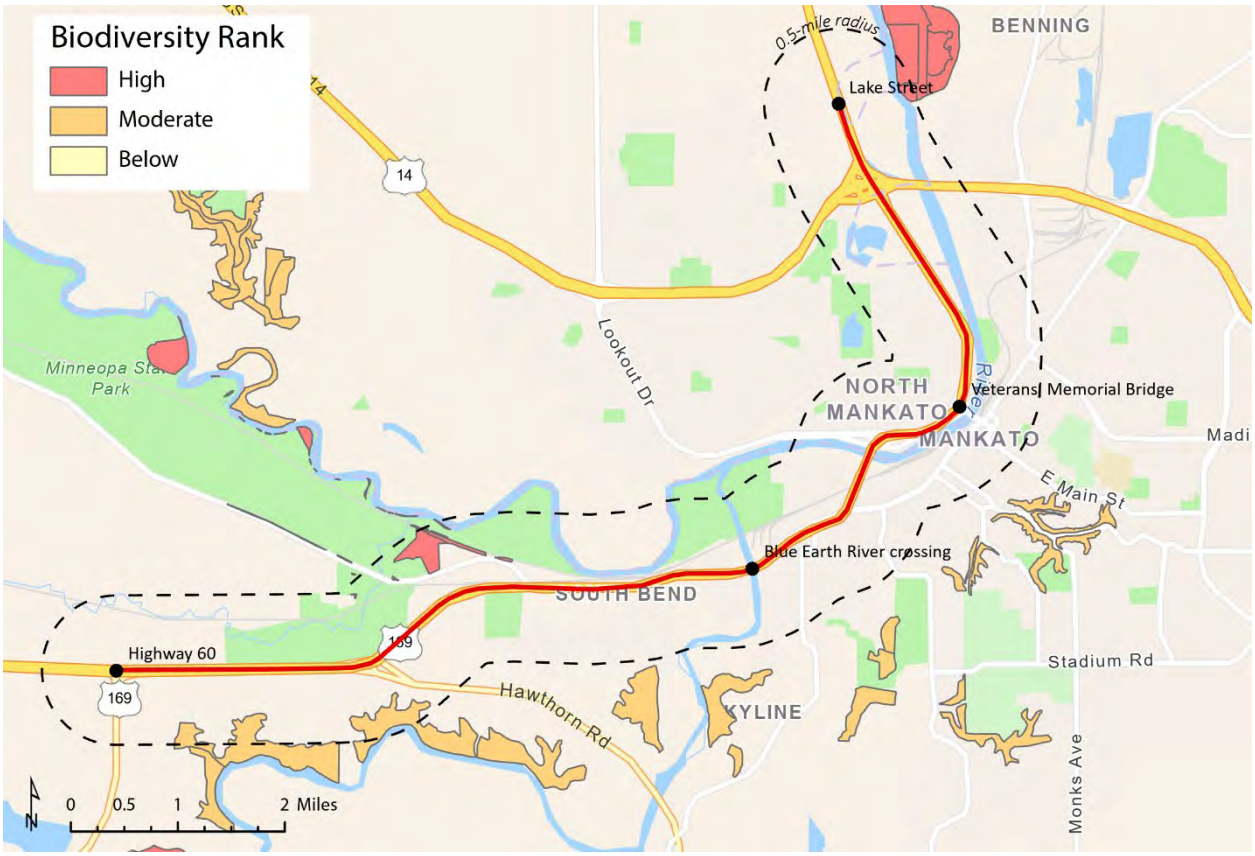
Table 4: Potentially contaminated sites in the project area

Activity	Northern Subarea	Middle Subarea	Southern Subarea	TOTAL
Aboveground Tanks	2	4	3	9
Brownfields, Voluntary Investigation and Cleanup	1	6	0	7
Brownfields, Voluntary Investigation and Cleanup	0	1	0	1
CERCLIS Site	1	0	0	1
Construction Stormwater	20	71	6	97
Feedlots	0	0	3	3
Hazardous Waste	55	87	19	161
Hazardous Waste, Minimal quantity generator	14	11	0	25
Hazardous Waste, Small quantity generator	1	0	0	1
Hazardous Waste, Very small quantity generator	6	7	1	14
Industrial Stormwater	2	1	2	5
Multiple Activities	37	43	15	95
Petroleum Remediation, Leak Site	7	9	5	21
RCRA Remediation	0	1	0	1
Site Assessment	0	0	1	1
Solid Waste	0	1	1	2
Solid Waste, Closed Landfill privately managed	1	0	0	1
Underground Tanks	8	19	5	32
Wastewater, Industrial NPDES/SDS Permit	1	1	0	2
TOTAL	**156**	**262**	**61**	**479**

F. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources

Native plant communities in the project area were identified using the MnDNR's Native Plant Communities dataset for sites surveyed by MnDNR ecologists (Figure 5). Table 5 shows the native plant communities by subarea, organized by total acreage for the entire study area.

Figure 5: Native plant communities



Most of the native plant communities exist in the southern subarea, a majority of which are Pin Oak – Bur Oak Woodlands. There is a Red Oak - Sugar Maple - Basswood - Forest directly adjacent to the corridor in Minneopa State Park, north of the intersection at Highway 169 and Hawthorn Road.

Only 12 acres of surveyed sites native plant communities exist in the Northern subarea—on the east side of the Minnesota River across from the Kiwanis Recreation Area—and no native plant species exist in the developed middle subarea. The low numbers in may be due to a lack of surveyed sites in those two subareas. One area to keep in mind for the project is the Kiwanis Recreation Area in the Northern subarea.

Table 5: Native plant communities in the project area

Name	Northern Subarea (Acres)	Middle Subarea (Acres)	Southern Subarea (Acres)	TOTAL
Pin Oak - Bur Oak Woodland	11	0	156	168
Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	0	0	65	65
Silver Maple - (Virginia Creeper) Floodplain Forest	0	0	6	6
Dry Sand - Gravel Prairie (Southern)	0	0	1	1
Mesic Prairie (Southern)	0	0	0	0
Seepage Meadow/Carr	0	0	0	0
TOTAL	12	0	228	240

Most of the project area has been previously disturbed for development or is used for agriculture. As such, habitat present in the project area and vicinity has been fragmented or degraded. In general, the project area consists of the MnDOT right of way of Highway 169. Natural resources in the project area consist of scattered stands of trees, landscape plantings that line the Highway 169 right of way, grassy areas, lakes, streams, minor rock outcroppings, and wetlands. Grassed areas are primarily in the right of way of Highway 169.

Any wildlife displaced by any projects or construction resulting from the completion of this study will likely relocate to suitable nearby areas, including lands immediately adjacent to the corridor zone. There will be vegetation impacts because of the project, including the removal of trees and shrubs primarily located within the right of way of Highway 169. Landscaping or reseeding with native plants will be used to mitigate impacts as a result of the project.

G. Transportation

This section describes elements of the existing transportation network, information related to land use, traffic operations, safety, access, and non-motorized connections. This section concludes with a review of known social, economic, and environmental (SEE) resources considerations within the study area.

Functional Classification

The functional classification system is used to create a roadway network that efficiently collects and distributes traffic from neighborhoods to the state highway system. A successful system coordinates and manages mobility, roadway design, and route alignment as well as seeks to match current and future access and land use with the adjacent roadway's purpose, speeds, and spacing. The functional classification system is comprised of principal arterials, minor arterials, major and minor collectors, and local roadways.

Highway 169 serves as a north-south principal arterial and National Highway System (NHS) route. It provides direct and relatively high-speed connections to southern Minnesota and beyond and to the north to the Twin Cities Metropolitan Area and northern Minnesota. The existing ADT (vehicles per day) ranges from 16,600 at the north end to 32,500 in the middle and 23,600 at the southern

end of the study area. Figure 4 in the existing conditions report shows the existing functional classification network in the study area.

Highway 169 functions as a hybrid freeway-expressway in the MAPO planning area, with access restricted to grade-separated interchanges through the urban core of Mankato and North Mankato and at-grade (signalized and unsignalized) access points as the corridor extends radially from the urban core. The middle subarea (Blue Earth River crossing to Veterans' Memorial Bridge) is the only full freeway segment in the study area with a four-lane corridor. The northern subarea (Veterans Memorial Bridge to Lake Street) and southern subarea (Highway 60 to the Blue Earth River crossing) are both a four-lane divided expressway corridor.

One other principal arterial, US Highway 14/Trunk Highway 60, and six minor arterials connect to Highway 169 in the study area. Minor arterials include Belgrade Avenue/Mulberry Street, Lookout Drive, Riverfront Drive, Trunk Highway 68, Gadwall Road/County State Aid Highway (CSAH) 69), CSAH 33, CSAH 69/Hawley Street, and Hawthorn Road/CSAH 90).

Figure 5 in the existing conditions report shows the roadway jurisdiction in the study area.

Regional Multimodal Corridor

Located in south central Minnesota, the Mankato/North Mankato metropolitan planning area is 75 miles south of Minneapolis-St. Paul at the junction of US Trunk Highway (TH) 14 and Highway 169. The area has experienced widespread growth across the metropolitan area and serves southern Minnesota as a hub for health care, education, retail, agriculture, and industry.

Highway 169 is the primary transportation corridor for funneling freight into the Twin Cities from the Mankato/North Mankato region and southern Minnesota. This area produces almost half of Minnesota's corn, soybeans and ethanol, making Minnesota third in the nation for production among all states. Other major commodities moving along this corridor include aggregates, clay and sand, hogs, manufactured goods and food products. Other key freight attributes of the Highway 169 corridor between Mankato and the Twin Cities include:

- Moves the equivalent of 30,000 tons of freight by truck per day with an average daily vehicle count of 1,200 – 3,700 heavy commercial vehicles.
- Carries the fifth heaviest freight volume of any highway in Minnesota – the top four are I-94, I-90, I-35 and MN 52.
- Connects major producers of ethanol, biodiesel, and other byproducts to markets and refiners along MN 60 and the adjacent Union Pacific Railroad.
- Provides one of two major conduits to the Ports of Savage for grain exports via the Minnesota and Mississippi River systems.

Recreational travel along the corridor includes at least two bicycle/pedestrian trails. One is located along the north side of Highway 169 and runs between the from urban core to Minneopa State Park and the city of Lake Crystal. The other is runs between the urban core to Kiwanis Recreational

Area along the top of the levee/floodwall. Both trails connect to a larger county-wide recreational trail and state trail system.

H. Visual

The project area views consist of a mixture of open space, commercial and residential. The northern subarea includes some views of strip mall commercial developments, low to medium density residential, and open space that include trees, grass and shrubs along Highway 169. The middle subarea view includes downtown commercial and medium density residential. Views of the rivers in the middle subarea are mostly obstructed by development or freeway barriers except on the Minnesota River bridge and Blue Earth River bridge crossings. The southern subarea consists of open space, low-density residential, and commercial views.

I. Other Potential Effects

Environmental Justice

Environmental justice populations are minority and/or low-income populations that are meaningfully greater than those of the general population. “Meaningfully greater” for environmental justice populations is generally defined as one where the minority or low-income population is either 10 percent higher than the county average, or greater than 50 percent of the total geographic unit, or determined based on input from local officials or stakeholders (FHWA Office of Human Environment, 2012).

Since there are environmental justice populations located in the Hwy 169 corridor, these populations have the potential to experience disproportional impacts should impacts during construction activities along the corridor happen to be limited to the area where the environmental justice populations are located. However, permanent impacts of projects along the corridor are intended to improve the transportation corridor for all users.

For more information on the regulatory context, see the Environmental Justice (EJ) Technical Memo.

Air, Noise, and Cumulative Potential Effects

Air, noise and cumulative potential effects will be considered in a future NEPA analysis once a project is funded.

Recreational Land Effects

Since recreational land is adjacent to the highway right-of-way there may be a need to obtain land from these properties. This means right-of-way processes and construction plans will need to be coordinated with the Federal Highway Administration, Mn Department of Natural Resources, the local owners of jurisdiction, and potentially the National Park Service.

Cultural and Historic Properties

Cultural and Historic properties will need to be reviewed when specific projects are identified for this corridor. Even though there are no designated tribal lands in this area, the confluence of the Blue Earth and Minnesota Rivers has cultural significance for the Dakota people.

Existing & No-Build Conditions Appendix D: Existing Conditions Safety Memo

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AREA PLANNING ORGANIZATION

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AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Existing and Future Safety Evaluation

Date: October 6, 2021

To: Charles Androsky, Transportation Planner, MAPO

From: Scott McBride, PE, Project Manager, Bolton & Menk, Inc.

Kelsey Retherford, PE, Traffic Engineer, Bolton & Menk, Inc.

Subject: Existing and Future Safety Evaluation

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO)

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Introduction

The Mankato/North Mankato Area Planning Organization (MAPO) in collaboration with the Cities of North Mankato, Mankato, Blue Earth County, Nicollet County, and the Minnesota Department of Transportation (MnDOT) are working to identify transportation improvements on Highway 169. This report summarizes the existing and future safety conditions of Highway 169 from Lake St to Highway 60. The existing safety analysis includes an overview of the current crash issues at intersections, interchanges, and along the highway segment. The future safety analysis summarizes the anticipated crash frequency and severity with alternative designs.

Existing Safety Analysis

The existing safety along the Highway 169 was analyzed by reviewing the crash history along the corridor. **Figure 1** in the **Appendix** summarizes the crash trends and key findings of the analysis. This figure shows which intersections have a crash issue, what the most common crash types were at intersections, and the location of the fatal, pedestrian, and bicycle crashes.

Intersection Crash Analysis

A crash review was completed for the intersections and segments throughout the project area for the previous five years (2015-2019). **Table 1** provides a crash summary for each intersection. This table details the total crash rate data, not the fatal & serious injury crash rate data. The latest available crash rates are from 2015 and were used for comparison purposes as current statewide average data is unavailable.

Table 1 – Intersection Crash Summary (2015-2019)

Intersection	Total Crashes	Severe Crashes (K + A)	Actual Crash Rate	Statewide Average	Critical Rate	Critical Index
Lake St NW (North Access) at TH 169	5	0	0.18	0.18	0.41	0.44
Lake St NW (Southern Access) at TH	6	0	0.20	0.18	0.40	0.50
Lind St at TH 169	70	1	1.45	0.45	0.71	2.04
Webster Ave at TH 169	29	0	0.61	0.45	0.71	0.86
Belgrade Ave at NB TH 169 Ramps	21	0	0.50	0.70	1.04	0.48
Belgrade Ave at SB TH 169 Ramps	27	1	0.83	0.70	1.09	0.76
Riverfront Dr at NB TH 169 Ramps	19	0	0.49	0.18	0.37	1.32
Riverfront Dr at SB TH 169 Ramps	11	0	0.35	0.52	0.86	0.41
CSAH 69 (Hawley St) at TH 169	12	1	0.26	0.18	0.36	0.72
CSAH 33 at TH 169	8	1	0.17	0.18	0.36	0.47
TH 68 at TH 169	17	2	0.38	0.18	0.36	1.06
CSAH 69 (Gadwall Rd) at TH 169	2	1	0.06	0.18	0.38	0.16
Loren Dr at TH 169	1	0	0.04	0.18	0.42	0.10
CSAH 69 (Gadwall Rd) West at TH 169	1	0	0.04	0.18	0.41	0.10
TH 60 at TH 169	13	0	0.47	0.25	0.52	0.90

Table 1 shows that three intersections have a critical index greater than one. A critical index greater than one indicates that the intersection is operating outside the normal range when compared to similar intersections statewide.

The crash worksheets for each intersection can be found in the **Appendix**. The intersections operating outside the normal range were further analyzed to understand the crash trends.

Lind St at TH 169

Over the past five years there have been 70 crashes that have occurred at the intersection of Lind St at TH 169. **Table 2** summarizes the crash types and **Table 3** summarizes the crash severity that occurred at the intersection.

Table 2 – Lind St at TH 169 Crash Type

Crash Type	Frequency
Rear End	63
Right Angle	3
Sideswipe - Same Direction	2
Left Turn	1
Ran off Road	1

Table 3 – Lind St at TH 169 Crash Severity

Crash Severity	Frequency
Fatal	0
Serious Injury	1
Minor Injury	4
Possible Injury	12
Property Damage Only	53

Table 2 shows that rear end crashes were the most common at the intersection, accounting for 63 (90%) of the crashes. Of the 63 rear end crashes, 42 occurred along the northbound TH 169 intersection approach. **Table 3** shows that most crashes resulted in property damage, however there was one serious injury and four minor injury crashes at the intersection in the last five years. The serious injury crash involved one vehicle that ran off the roadway. The crash report listed that the driver was not in a proper state to be driving so the intersection geometry and traffic control device did not have an impact on the crash.

The observed crash rate at Lind St and TH 169 was found to be 1.45. This is over three times higher than the statewide average crash rate for similar intersections which is 0.45. The critical index was found to be 2.04 which shows that the intersection is operating outside the normal range. The number of crashes at this intersection would need to be reduced by 35 over a five-year timeframe to fall within the normal range. The fatal and serious injury crash critical index was found to be 0.74 which shows that the intersection is operating within the normal range for fatal and serious injury crashes.

Riverfront Dr at NB TH 169

Over the past five years there have been 19 crashes that have occurred at the intersection of Riverfront Dr at NB TH 169. **Table 4** summarizes the crash types and **Table 5** summarizes the crash severity that occurred at the intersection.

Table 4 – Riverfront Dr at NB TH 169 Crash Type	
Crash Type	**Frequency**
Rear End	8
Ran off Road	7
Right Angle	2
Pedestrian	1
Left Turn	1

Table 5 – Riverfront Dr at NB TH 169 Crash Severity	
Crash Severity	**Frequency**
Fatal	0
Serious Injury	0
Minor Injury	1
Possible Injury	2
Property Damage Only	17

Table 4 shows that rear end crashes were the most common at the intersection accounting nearly half of the crashes. Five of the rear end crashes occurred along westbound Riverfront Dr as they were turning right onto the TH 169 entrance ramp. Westbound right vehicles must yield to eastbound left vehicles at the ramp. Crashes along westbound Riverfront Dr indicates that vehicles are not always anticipating the need to stop and yield to other traffic. Three of the rear end crashes occurred along the northbound TH 169 exit ramp and one crash occurred along eastbound Riverfront Dr. **Table 5** shows that most crashes resulted in property damage, however there was one minor injury crashes at the intersection in the last five years.

The observed crash rate at Riverfront Dr and SB TH 169 was found to be 0.49. This is nearly three times higher than the statewide average crash rate for similar intersections which is 0.18. The critical index was found to be 1.32 which shows that the intersection is operating outside the normal range. The number of crashes at this intersection would need to be reduced by four over a five-year timeframe to perform within the normal range.

TH 68 at TH 169

Over the past five years there have been 17 crashes that have occurred at the intersection of TH 68 at TH 169. **Table 6** summarizes the crash types and **Table 7** summarizes the crash severity that occurred at the intersection.

Table 6 – TH 68 at TH 169 Crash Type	
Crash Type	**Frequency**
Right Angle	6
Ran off Road	5
Rear End	3
Left Turn	2
Sideswipe - Same Direction	1

Table 7 – TH 68 at TH 169 Crash Severity	
Crash Severity	**Frequency**
Fatal	1
Serious Injury	1
Minor Injury	4
Possible Injury	3
Property Damage Only	8

Table 6 shows that right angle crashes were the most common at the intersection. All of the right angle crashes involved a vehicle attempting to turn left from TH 68 onto northbound TH 169, but were struck by a vehicle going southbound along TH 169. The fatal, serious injury and two of the minor injury crashes at the intersection were from right angle. **Table 7** shows that most crashes resulted in injury over the last five years.

The observed crash rate at TH 68 at TH 169 was found to be 0.38. This is over two times higher than the statewide average crash rate for similar intersections which is 0.18. The critical index was found to be 1.06 which shows that the intersection is operating outside the normal range. The number of crashes at this intersection would need to be reduced by one over a five-year timeframe to perform within the normal range.

With one fatal crash and one serious injury crash the fatal and serious injury observed crash rate was found to be 4.43. This is over 13 times higher than statewide average crash rate for similar intersections which is only 0.33. The critical index for fatal and serious injury crashes was found to be 1.76 which shows that the intersection is operating outside the normal range for fatal and serious injury crashes.

Interchange Crash Analysis

Crashes at the TH 14, Belgrade Ave, Lookout Dr, Riverfront Dr, and CSAH 90 interchange ramps were also analyzed. Since the ramp merge areas are not considered a typical intersection type by the crash worksheets, these crashes were reviewed to for crash trends, but could not be compared to other interchanges statewide to determine if the number of crashes is statistically significant.

TH 14 at TH 169

Over the past five years there have been 22 crashes that have occurred at the TH 14 and TH 169 interchange. There were three minor injury crashes, five possible injury crashes, and thirteen property damage crashes. The location of the crashes and major trends in crash types are summarized below.

- 11 crashes at the EB TH 14 Exit Ramp
    - 6 of the crashes were right angle crashes involving a vehicle attempting to turn left onto NB TH 169 from the exit ramp and a vehicle along SB TH 169. One resulted in minor injury, three in possible injury, and two were property damage only crashes.
    - The other five crashes consisted of three rear ends, one ran off the road and one a right turn into traffic. All four crashes resulted in property damage only.
- 5 crashes at the WB TH 14 Exit Ramp
    - 3 crashes were along the exit ramp to SB TH 169. 2 of those crashes occurred in the merge area along SB TH 169 and the other crash was a vehicle that ran off the road along the loop exit ramp. All three crashes resulted in property damage only.
    - 2 crashes were along the exit ramp to NB TH 169. Both crashes involved a vehicle who crossed over the solid white lines along the ramp and NB TH 169 traffic while attempting to get back onto WB TH 14 via the left turn from NB TH 169 to the WB TH 14 entrance ramp. There is a sign along the exit ramp that shows this left turn movement is not allowed. These crashes were listed as right angle crashes. One of the crashes resulted in possible injury and one in property damage.

- 4 crashes at the WB TH 14 Entrance Ramp
    - 3 of the crashes were left turn crashes involving a vehicle attempting to turn left onto the WB TH 14 entrance ramp and a vehicle along SB TH 169. Two of the crashes resulted in minor injury and third resulted in possible injury.
    - The fourth crash was a ran off road crash that resulted in property damage involving a vehicle attempting to drive along the ramp at too high of a speed.
- 2 crashes at the EB TH 14 Entrance Ramp
    - Both crashes involved a vehicle running off the road along the loop ramp from SB TH 169 to EB TH 14. Both crashes resulted in property damage only.

Table 8 shows the crash severity breakdown at the TH 14 and TH 169 interchange. This shows that most crashes resulted in property damage, however there were three minor injury crashes and five possible injury crashes at the interchange in the last five years.

Table 8 – TH 14 at TH 169 Crash Severity	
Crash Severity	**Frequency**
Fatal	0
Serious Injury	0
Minor Injury	3
Possible Injury	5
Property Damage Only	13

Belgrade Ave at TH 169

No crashes were found associated with the merge areas along TH 169 and the Belgrade entrance ramps. There were three ran off the road crashes reported along the exit ramps. One of the crashes occurred along the NB TH 169 exit ramp and resulted in property damage only. The report indicates that the driver lost control due to icy roadway conditions and ran into the cement wall to the right of the ramp. The other two were along the SB TH 169 exit ramp. One of the crashes indicated that the driver failed to follow the curve of the ramp running off the road and into several trees. This crash resulted in possible injury. The other crash occurred at the very start of the ramp diverge. The driver was noted to have been drinking and exited the roadway hitting the guardrail. This crash resulted in property damage only.

Lookout Drive at TH 169

Over the past five years there have been 19 crashes that have occurred at the Lookout Dr and TH 169 interchange. The location of the crashes and major trends in crash types are summarized below.

- 11 crashes along the NB TH 169 Exit Ramp
- 4 crashes along the SB TH 169 Exit Ramp
- 2 crashes along the NB TH 169 Entrance Ramp
- 2 crashes long the SB TH 169 Entrance Ramp

15 of the 19 crashes were vehicles that ran off the road while traversing the ramps at this interchange. **Table 9** shows the crash severity breakdown at the Lookout Dr and TH 169 interchange. This shows that most crashes resulted in property damage, however there were four minor injury crashes and two possible injury crashes at the interchange in the last five years. The two possible injury crashes and one of the minor injury crashes occurred along the southbound TH 169 exit ramp. One of the crashes was a rear end, one was a ran off the road, and one was a sideswipe same direction crash. There were two minor injury ran off the road crashes along the southbound TH 169 entrance ramp and the other minor injury crash was also a ran off road crash along the northbound TH 169 exit ramp.

Table 9 – Lookout Dr at TH 169 Crash Severity

Crash Severity	Frequency
Fatal	0
Serious Injury	0
Minor Injury	4
Possible Injury	2
Property Damage Only	13

Riverfront Dr at TH 169

There were 11 crashes reported at the TH 169 and Riverfront Dr merge/diverge areas over the past five years. The location of the crashes and major trends in crash types are summarized below.

- 4 crashes along the NB TH 169 Entrance Ramp/TH 169 merge area
    - One of the crashes was a sideswipe passing crash that involved two vehicles attempting to merge onto NO TH 169. This crash resulted in property damage only.
    - Two of the crashes were rear end crashes along the entrance ramp. One of the crashes resulted in property damage only and the other in a possible injury.
    - The fourth crash was a vehicle who lost control and ran off road into the bridge barrier. This crash resulted in property damage only.

- 4 crashes along the SB TH 169 Exit Ramp/TH 169 diverge area
    - Three of the crashes were rear ends that occurred when traffic along the exit ramp was backed up to the highway. The vehicles were not anticipating the back up and rear ended the vehicle in front of them when attempting to stop. These crashes resulted in property damage only.
    - The other crash was a sideswipe crash involving a vehicle that had merged onto SB TH 169 from Lookout Dr and was attempting to exit onto Riverfront Dr. A semi-truck attempting to exit onto Riverfront Dr did not see the other vehicle. This crash resulted in property damage only.
- 2 crashes along the NB TH 169 Exit Ramp/TH 169 diverge area
    - Both of the crashes were ran off road crashes caused by current weather conditions that resulted in property damage only.
- 1 crash along the SB TH 169 Entrance Ramp/TH 169 merge area
    - This crash occurred at the entrance ramp from the Riverfront Dr/Woodland Ave entrance ramp. The vehicle merging sideswiped a vehicle along the mainline causing the merging vehicle to spin out and roll several times. This crash resulted in property damage only.

CSAH 90 at TH 169

Over the past five years there have been four crashes that have occurred at the CSAH 90 and TH 169 interchange. One of the crashes resulted in a fatality. The fatal crash involved a motorcycle merging onto northbound TH 169 from westbound CSAH 90 that hit a semi-truck. This crash is discussed in more detail in the fatal crashes section of the report. The other three crashes resulted in property damage only. One of the property damage crashes involved a vehicle merging onto southbound TH 169. The crash involved a vehicle along SB TH 169 and a vehicle merging from WB CSAH 90. The crash report states that the vehicle merging from WB CSAH 90 failed to yield to the mainline vehicle.

SB TH 169 to EB CSAH 90 is the only movement that does not have a typical ramp at this interchange. There is a left turn lane along SB TH 169 where vehicles must wait for a gap in NB TH 169 traffic before turning onto CSAH 90.

The other two crashes involved vehicles attempting to turn left onto CSAH 90 from southbound TH 169. One of the crashes involved a vehicle along SB TH 169 that caused a crash while attempting to get into the left turn lane. The vehicle was noted to be in the right most lane and abruptly slowed down trying to change lanes causing a rear end crash. The other crash of a vehicle attempting to turn left onto CSAH 90 was a ran off the road crash. While making the turn the vehicle left the roadway and struck a sign. Both of these crashes appear to be caused by driver error, not the unique design of the interchange.

Segment Crash Analysis

A crash review was completed for TH 169 as a segment as well with each of the three subareas analyzed separately. The descriptions below depict these three subareas.

Northern Subarea - The northern subarea runs from Lake Street to the Veterans' Memorial Bridge/Belgrade Ave. This segment is a four-lane divided expressway with a speed limit of 50 mph.

Middle Subarea – The middle subarea runs from the Veterans' Memorial Bridge/Belgrade Ave to the Blue Earth River crossing. This is a four-lane freeway corridor with a speed limit of 50 mph.

Southern Subarea – The southern subarea runs from the Blue Earth River crossing to Highway 60. This is a four-lane expressway corridor with a speed limit ranging from 50 to 65 mph.

All three subareas were analyzed with and without intersection related crashes. **Table 10** summarizes the key crash findings along each segment without including the intersection related crashes. This table details the total crash rate data, not the fatal & serious injury crash data.

Table 10 – Segment Crash Summary (2015-2019)*

Segment	Total Crashes	Severe Crashes (K + A)	Actual Crash Rate	Statewide Average	Critical Rate	Critical Index
Lake St NW to Belgrade Ave	28	1	0.29	0.05	0.69	0.42
Belgrade Ave to the Blue Earth River Crossing	105	0	0.77	0.82	1.02	0.75
Blue Earth River Crossing to TH 60	58	1	0.31	0.50	0.64	0.48

*Does not include intersection related crashes within each segment

Table 10 shows that without the intersection related crashes included, none of the segments show a crash issue, but there are a significant amount of crashes along each subarea of TH 169. The most common crash type in all three subareas is ran off the road crashes. This accounts for 15 (54%) of the 28 crashes in the northern subarea, 70 (67%) of the 105 crashes in the middle subarea and 33 (57%) of the 58 crashes in the southern subarea.

Table 11 summarizes the key crash findings along each segment with the intersection and ramp related crashes included. This table details the total crash rate data, not the fatal & serious injury crash data.

Table 11 – Segment Crash Summary (2015-2019)

Segment	Total Crashes	Severe Crashes (K + A)	Actual Crash Rate	Statewide Average	Critical Rate	Critical Index
Lake St NW to Belgrade Ave	160	2	1.65	1.64	1.98	0.83
Belgrade Ave to the Blue Earth River Crossing	203	1	1.49	1.13	1.37	1.09
Blue Earth River Crossing to TH 60	116	7	0.61	1.64	1.88	0.32

Table 11 shows that the middle subarea operates with a critical index of 1.09 which indicates that the segment operates outside the normal range. Although the total crash critical index is less than one along the southern subarea from the Blue Earth River Crossing to TH 60, with seven severe crashes in the last 5 years, this segment has a fatal & serious injury critical index of 1.03. This indicates that the segment is operating above the normal range for fatal and serious injury crashes compared to similar roadway segments statewide.

Fatal Crashes

A ten-year crash analysis (2010-2019) was completed for fatal crashes throughout the project area. Five fatal crashes occurred along TH 169 within the project limits in the last ten years.

- TH 169 near Riverfront Dr (2013) – Vehicle was driving along northbound TH 169 near Riverfront Dr when they lost control and collided with the concrete median barrier.
- CSAH 69 (Hawley St) at TH 169 (2015) – Left turn crash at the intersection involving a vehicle along northbound TH 169 and a vehicle making a southbound left turn from TH 169 onto CSAH 69 (Hawley St).
- TH 68 at TH 169 (2015) – Right angle crash at the intersection involving a vehicle along southbound TH 169 and a vehicle making an eastbound left turn from TH 68 onto northbound TH 169.
- CSAH 69 (Gadwall Rd) at TH 169 (2017) – Right angle crash at the intersection involving a vehicle along southbound TH 169 and a vehicle making an eastbound left turn from CSAH 69 (Gadwall Rd) onto northbound TH 169.
- CSAH 90 at TH 169 (2017) – Motorcycle was attempting to merge onto northbound TH 169 from westbound CSAH 90 and hit a semi-truck. This crash was caused by driver error by the motorcycle. The crash report indicates that he failed to stay in his lane, cutting over into traffic too soon and striking the back end of the semi-truck.

Pedestrian and Bicycle Crashes

A ten-year crash analysis (2010-2019) was also completed for pedestrian and bicycle crashes throughout the project area. There were four crashes involving a pedestrian or a bicycle in the last ten years.

- Pedestrian Crashes
    - Serious injury crash along TH 169 between River Ln and Webster Ave. Pedestrian was on the shoulder of TH 169 when hit by vehicle. (2019)
    - Possible injury crash at TH 169 and Webster Ave intersection. A pedestrian was crossing the south side of the intersection from east to west when hit by a semi-truck along northbound TH 169 making a right turn on red. (2017)
- Bicycle Crashes
    - Non-injury crash at the intersection of Riverfront Dr and the NB TH 169 Ramps. Vehicle was making a northbound right turn onto Riverfront Dr from the NB TH 169 exit ramp and hit a bicyclist crossing the exit ramp. (2018)

- Possible injury crash at the intersection of Riverfront Dr and the SB TH 169 Ramps. Vehicle was making a southbound right turn onto Riverfront Dr from the SB TH 169 exit ramp and hit a bicyclist crossing Riverfront Dr. (2015)

Geometric Concerns

While analyzing the crash data there were a few locations that were found to have geometric concerns. These are described below:

WB TH 14 to NB TH 169 Exit Ramp

There were two crashes along the WB TH 14 exit ramp to NB TH 169. Both crashes involved a vehicle who crossed over the solid white lines along the ramp and NB TH 169 traffic while attempting to get back onto WB TH 14 via the left turn from NB TH 169 to the WB TH 14 entrance ramp. One of the crashes resulted in possible injury and one in property damage. There is a sign along the exit ramp that shows this left turn movement prohibited and the gore is painted approximately 100 ft past the location of the turn lane. These crashes indicate that the sign and paint prohibiting this movement might not be enough. Delineators or other items to create a physical gore should be considered.

Riverfront Dr at NB TH 169 Entrance Ramp

There were five rear end crashes that occurred along westbound Riverfront Dr as vehicles were turning right onto the NB TH 169 entrance ramp. Westbound right vehicles must yield to eastbound left vehicles at the ramp. These crashes indicate that vehicles are not always anticipating the need to stop and yield to other traffic. With the right turn channelized and the intersection unsignalized vehicles may be incorrectly assuming they have the right of way and therefore are not expecting the vehicle in front of them to stop for oncoming traffic.

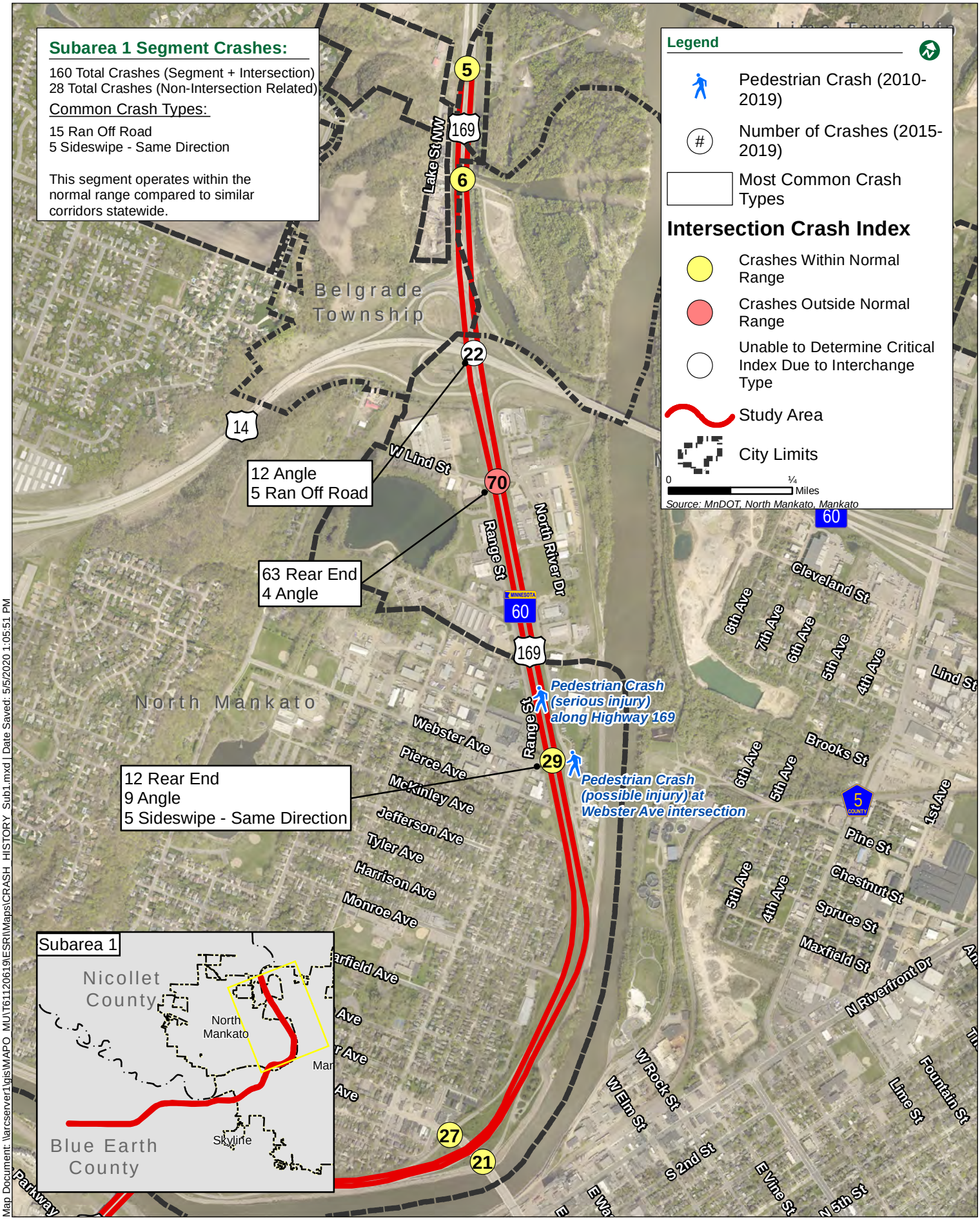
TH 68 at TH 169

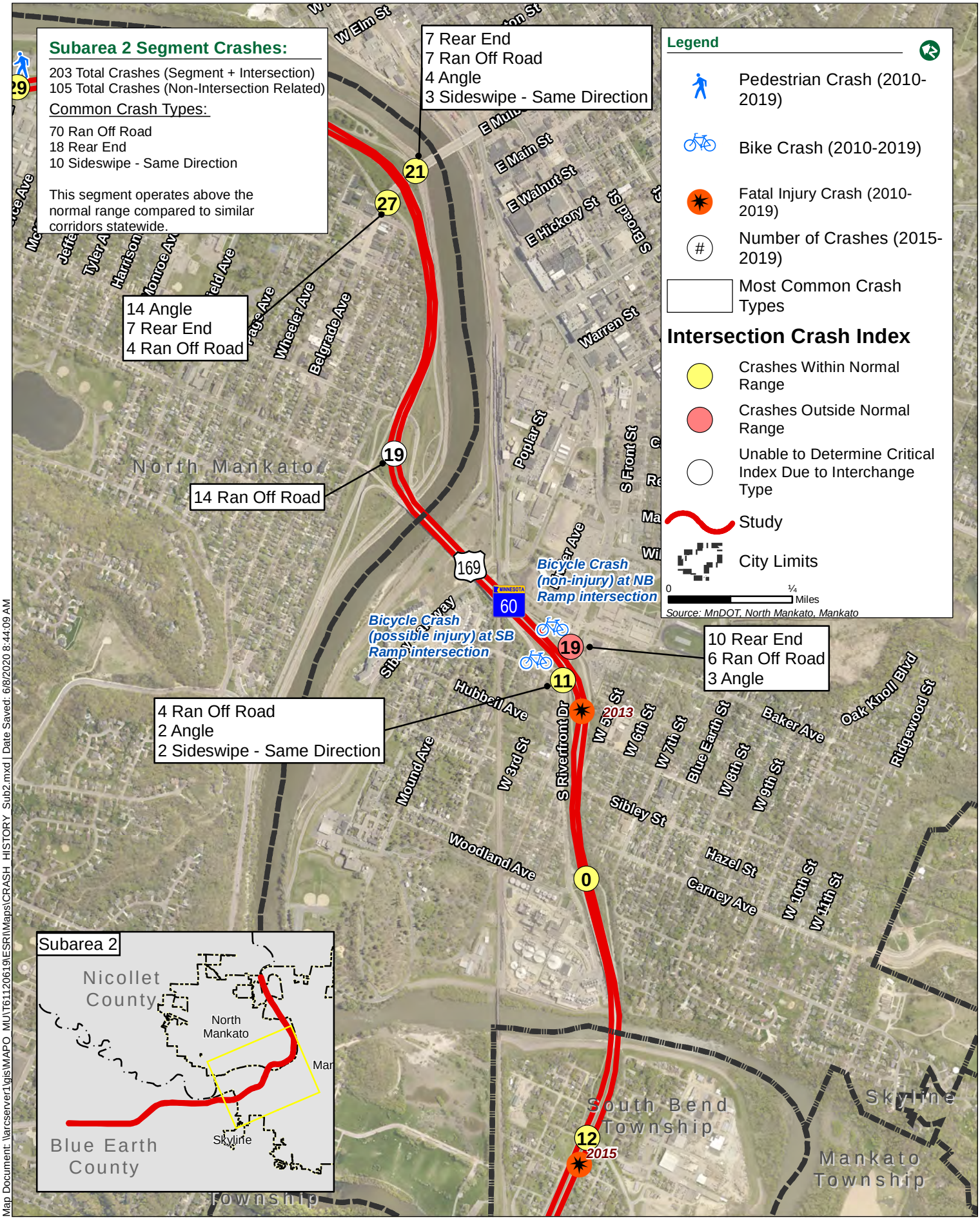
There were six right angle crashes over the last five years involving a vehicle attempting to turn left from TH 68 onto northbound TH 169 that were struck by a vehicle going southbound along TH 169. These right angle crashes resulted in a fatal, serious injury, two of the minor injury, and a possible injury crash. With speeds along TH 169 at 65 mph, the intersection sight distance for the left turn movement from TH 68 onto TH 169 is 720 ft according to the AASTHO Green Book. This distance does not appear to be met for southbound TH 169 traffic due to the vertical curvature of the roadway.

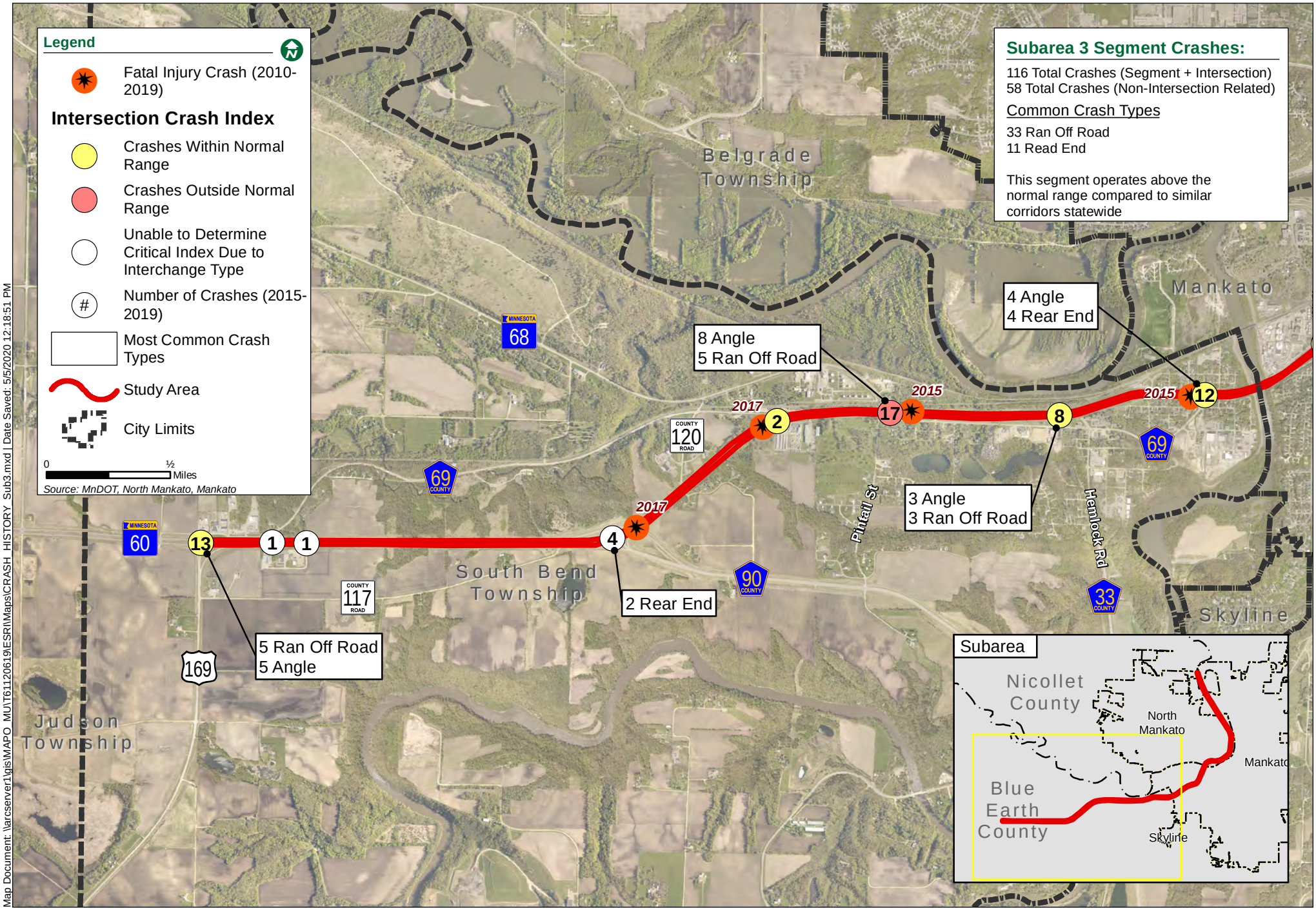
Future Safety Analysis

As a part of the alternative evaluation the ability of each option to safety accommodate all system users was analyzed (Goal C). Specifically, each concept was evaluated for how it reduces crash rates and provides safe pedestrian and bicycle facilities. Please see the “Identification and Evaluation of Corridor Concepts” report for a summary of the safety analysis evaluation for each concept analyzed. Additionally, a more detailed safety benefit was calculated for each of the northern subarea concepts. Please see the “Benefit Cost Analysis” report for the more detailed analysis.

Safety Memo Appendix







Intersection Safety Screening

Intersection: TH 169 and Lake St NW (northern access)

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	0
Property Damage	5
Total Crashes	5

Intersection Characteristics	
Entering Volume	15,500
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	50 mph

Annual crash cost = $7,600

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.18
Statewide Average	0.18
Critical Rate	0.41
Critical Index	**0.44**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.33
Critical Rate	3.47
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.18 per MEV; this is 56% below the critical rate. Based on similar statewide intersections, an additional 7 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and Lake St NW (southern access)

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	1
Property Damage	5
Total Crashes	6

Intersection Characteristics	
Entering Volume	16,500
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	50 mph

Annual crash cost = $24,200

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.20
Statewide Average	0.18
Critical Rate	0.40
Critical Index	**0.50**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.33
Critical Rate	3.32
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.20 per MEV; this is 50% below the critical rate. Based on similar statewide intersections, an additional 7 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and Lind St

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	4
Possible Injury	12
Property Damage	53
Total Crashes	70

Intersection Characteristics	
Entering Volume	26,500
Traffic Control	Signals
Environment	Suburban
Speed Limit	50 mph

Annual crash cost = $529,760

Statewide Comparison

Signals: high volume, high speed

Total Crash Rate	
Observed	1.45
Statewide Average	0.45
Critical Rate	0.71
Critical Index	**2.04**

Fatal & Serious Injury Crash Rate	
Observed	2.07
Statewide Average	0.48
Critical Rate	2.78
Critical Index	**0.74**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 1.45 per MEV; this is 2.0 times the critical rate. If crashes were reduced by 35 over five years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 2.07 per 100 MEV; this is 26% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and Webster Ave

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	4
Possible Injury	3
Property Damage	22
Total Crashes	29

Intersection Characteristics	
Entering Volume	26,125
Traffic Control	Signals
Environment	Suburban
Speed Limit	50 mph

Annual crash cost = $219,240

Statewide Comparison

Signals: high volume, high speed

Total Crash Rate	
Observed	0.61
Statewide Average	0.45
Critical Rate	0.71
Critical Index	**0.86**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.48
Critical Rate	2.81
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.61 per MEV; this is 14% below the critical rate. Based on similar statewide intersections, an additional 5 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: NB TH 169 at Belgrade Ave

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	1
Property Damage	19
Total Crashes	21

Intersection Characteristics	
Entering Volume	22,800
Traffic Control	Signals
Environment	Suburban
Speed Limit	45 mph

Annual crash cost = $79,480

Statewide Comparison

Signals: high volume, low speed

Total Crash Rate	
Observed	0.50
Statewide Average	0.70
Critical Rate	1.04
Critical Index	**0.48**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.70
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.50 per MEV; this is 52% below the critical rate. Based on similar statewide intersections, an additional 23 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: SB TH 169 at Belgrade Ave

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	2
Possible Injury	7
Property Damage	17
Total Crashes	27

Intersection Characteristics	
Entering Volume	17,850
Traffic Control	Signals
Environment	Suburban
Speed Limit	45 mph

Annual crash cost = $324,040

Statewide Comparison

Signals: high volume, low speed

Total Crash Rate	
Observed	0.83
Statewide Average	0.70
Critical Rate	1.09
Critical Index	**0.76**

Fatal & Serious Injury Crash Rate	
Observed	3.07
Statewide Average	0.76
Critical Rate	4.26
Critical Index	**0.72**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.83 per MEV; this is 24% below the critical rate. Based on similar statewide intersections, an additional 9 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 3.07 per 100 MEV; this is 28% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: NB TH 169 and Riverfront Dr

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	2
Property Damage	16
Total Crashes	19

Intersection Characteristics	
Entering Volume	21,300
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	45 mph

Annual crash cost = $91,520

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.49
Statewide Average	0.18
Critical Rate	0.37
Critical Index	**1.32**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.33
Critical Rate	2.78
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.49 per MEV; this is 1.3 times the critical rate. If crashes were reduced by 4 over five years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: SB TH 169 and Riverfront Dr

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	3
Property Damage	7
Total Crashes	11

Intersection Characteristics	
Entering Volume	17,100
Traffic Control	Signals
Environment	Suburban
Speed Limit	45 mph

Annual crash cost = $94,440

Statewide Comparison

Signals: low volume, low speed

Total Crash Rate	
Observed	0.35
Statewide Average	0.52
Critical Rate	0.86
Critical Index	**0.41**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.42
Critical Rate	3.52
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.35 per MEV; this is 59% below the critical rate. Based on similar statewide intersections, an additional 16 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and CSAH 69 (Hawley St)

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	1
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	4
Property Damage	6
Total Crashes	12

Intersection Characteristics	
Entering Volume	25,150
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	50 mph

Annual crash cost = $337,520

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.26
Statewide Average	0.18
Critical Rate	0.36
Critical Index	**0.72**

Fatal & Serious Injury Crash Rate	
Observed	2.18
Statewide Average	0.33
Critical Rate	2.49
Critical Index	**0.88**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.26 per MEV; this is 28% below the critical rate. Based on similar statewide intersections, an additional 5 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 2.18 per 100 MEV; this is 12% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and CSAH 33

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	1
Possible Injury	0
Property Damage	6
Total Crashes	8

Intersection Characteristics	
Entering Volume	25,325
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	65 mph

Annual crash cost = $157,120

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.17
Statewide Average	0.18
Critical Rate	0.36
Critical Index	**0.47**

Fatal & Serious Injury Crash Rate	
Observed	2.16
Statewide Average	0.33
Critical Rate	2.48
Critical Index	**0.87**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.17 per MEV; this is 53% below the critical rate. Based on similar statewide intersections, an additional 9 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 2.16 per 100 MEV; this is 13% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and TH 68

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	1
Incapacitating Injury	1
Non-incapacitating Injury	4
Possible Injury	3
Property Damage	8
Total Crashes	17

Intersection Characteristics	
Entering Volume	24,725
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	65 mph

Annual crash cost = $539,960

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.38
Statewide Average	0.18
Critical Rate	0.36
Critical Index	**1.06**

Fatal & Serious Injury Crash Rate	
Observed	4.43
Statewide Average	0.33
Critical Rate	2.52
Critical Index	**1.76**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.38 per MEV; this is 1.1 times the critical rate. If crashes were reduced by 0 over five years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 4.43 per 100 MEV; this is 1.8 times the critical rate.

Intersection Safety Screening

Intersection: TH 169 and CSAH 69 (Gadwall Rd)

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	1
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	0
Property Damage	1
Total Crashes	2

Intersection Characteristics	
Entering Volume	19,195
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	65 mph

Annual crash cost = $229,520

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.06
Statewide Average	0.18
Critical Rate	0.38
Critical Index	**0.16**

Fatal & Serious Injury Crash Rate	
Observed	2.85
Statewide Average	0.33
Critical Rate	2.99
Critical Index	**0.95**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.06 per MEV; this is 84% below the critical rate. Based on similar statewide intersections, an additional 12 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 2.85 per 100 MEV; this is 5% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and Loren Dr

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	0
Property Damage	1
Total Crashes	1

Intersection Characteristics	
Entering Volume	14,700
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	65 mph

Annual crash cost = $1,520

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.04
Statewide Average	0.18
Critical Rate	0.42
Critical Index	**0.10**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.33
Critical Rate	3.60
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.04 per MEV; this is 90% below the critical rate. Based on similar statewide intersections, an additional 11 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and CSAH 69 (Gadwall Rd) (west end)

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	1
Property Damage	0
Total Crashes	1

Intersection Characteristics	
Entering Volume	14,795
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	65 mph

Annual crash cost = $16,600

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.04
Statewide Average	0.18
Critical Rate	0.41
Critical Index	**0.10**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.33
Critical Rate	3.58
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.04 per MEV; this is 90% below the critical rate. Based on similar statewide intersections, an additional 11 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 169 and TH 60

Crash Data, 2015-2019.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	2
Possible Injury	2
Property Damage	9
Total Crashes	13

Intersection Characteristics	
Entering Volume	15,200
Traffic Control	Thru / stop
Environment	Rural
Speed Limit	65 mph

Annual crash cost = $114,880

Statewide Comparison *Rural Thru / Stop*

Total Crash Rate	
Observed	0.47
Statewide Average	0.25
Critical Rate	0.52
Critical Index	**0.90**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	1.05
Critical Rate	5.34
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.47 per MEV; this is 10% below the critical rate. Based on similar statewide intersections, an additional 2 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Trunk Highway Section Summary

Section: Northern Subarea - TH 169 from Lake St NW to Belgrade Ave

Crash Data, 2015-2019. Excludes crashes at junctions.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	1
Possible Injury	3
Property Damage	23
Total Crashes	28

Section Characteristics	
Length	2.000 miles
Volume (ADT)	26,500
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Expressway

Annual crash cost per mile = $116,380

Statewide Comparison *Urban Expressway*

Total Crash Rate	
Observed	0.29
Statewide Average	0.50
Critical Rate	0.69
Critical Index	**0.42**

Fatal & Serious Injury Crash Rate	
Observed	1.03
Statewide Average	0.61
Critical Rate	2.14
Critical Index	**0.48**

Trunk Highway Section Summary

Section: Middle Subarea - TH 169 from Belgrade Ave to the Blue Earth River Crossing

Crash Data, 2015-2019. Excludes crashes at junctions.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	7
Possible Injury	12
Property Damage	86
Total Crashes	105

Section Characteristics	
Length	2.300 miles
Volume (ADT)	32,500
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Freeway

Annual crash cost per mile = $246,922

Statewide Comparison *Urban Freeway*

Total Crash Rate	
Observed	0.77
Statewide Average	0.82
Critical Rate	1.02
Critical Index	**0.75**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.49
Critical Rate	1.62
Critical Index	**0.00**

Trunk Highway Section Summary

Section: Southern Subarea - TH 169 from the Blue Earth River Crossing to TH 60

Crash Data, 2015-2019. Excludes crashes at junctions.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	5
Possible Injury	7
Property Damage	45
Total Crashes	58

Section Characteristics	
Length	4.400 miles
Volume (ADT)	23,500
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Expressway

Annual crash cost per mile = $106,500

Statewide Comparison *Urban Expressway*

Total Crash Rate	
Observed	0.31
Statewide Average	0.50
Critical Rate	0.64
Critical Index	**0.48**

Fatal & Serious Injury Crash Rate	
Observed	0.53
Statewide Average	0.61
Critical Rate	1.60
Critical Index	**0.33**

Trunk Highway Section Summary

Section: Northern Subarea - TH 169 from Lake St NW to Belgrade Ave

Crash Data, 2015-2019. Includes crashes at junctions.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	2
Non-incapacitating Injury	12
Possible Injury	24
Property Damage	122
Total Crashes	160

Section Characteristics	
Length	2.000 miles
Volume (ADT)	26,500
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Expressway

Annual crash cost per mile = $609,920

Statewide Comparison *Urban Expressway*

Total Crash Rate	
Observed	1.65
Statewide Average	1.64
Critical Rate	1.98
Critical Index	**0.83**

Fatal & Serious Injury Crash Rate	
Observed	2.07
Statewide Average	2.02
Critical Rate	4.39
Critical Index	**0.47**

Trunk Highway Section Summary

Section: Middle Subarea - TH 169 from Belgrade Ave to the Blue Earth River Crossing

Crash Data, 2015-2019. Includes crashes at junctions.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	16
Possible Injury	27
Property Damage	159
Total Crashes	203

Section Characteristics	
Length	2.300 miles
Volume (ADT)	32,500
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Freeway

Annual crash cost per mile = $586,035

Statewide Comparison *Urban Freeway*

Total Crash Rate	
Observed	1.49
Statewide Average	1.13
Critical Rate	1.37
Critical Index	**1.09**

Fatal & Serious Injury Crash Rate	
Observed	0.73
Statewide Average	0.67
Critical Rate	1.93
Critical Index	**0.38**

Trunk Highway Section Summary

Section: Southern Subarea - TH 169 from the Blue Earth River Crossing to TH 60

Crash Data, 2015-2019. Includes crashes at junctions.

Crashes by Crash Severity	
Fatal	4
Incapacitating Injury	3
Non-incapacitating Injury	13
Possible Injury	18
Property Damage	79
Total Crashes	117

Section Characteristics	
Length	4.400 miles
Volume (ADT)	23,500
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Expressway

Annual crash cost per mile = $480,655

Statewide Comparison *Urban Expressway*

Total Crash Rate	
Observed	0.62
Statewide Average	1.64
Critical Rate	1.88
Critical Index	**0.33**

Fatal & Serious Injury Crash Rate	
Observed	3.71
Statewide Average	2.02
Critical Rate	3.61
Critical Index	**1.03**

Existing & No-Build Conditions Appendix E: Issues Identification Infographic

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

BOLTON & MENK
Real People. Real Solutions.

Highway 169 Corridor Issues Identification

MAPO
MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION

Principal Arterial and National Highway System (NHS) route
Provides direct and relatively high-speed connections to southern Minnesota and to the Twin Cities Metropolitan Area

SPEED LIMIT 50 SPEED LIMIT 65
speed limit range in the project area

Vehicles per day on Highway 169

16,600	32,500	23,600
Northern Subarea	Middle Subarea	Southern Subarea

AM PEAK HOUR
Today there are no excessive intersection delays
2040: No intersections operate with excessive delay

PM PEAK HOUR
Today there are no excessive intersection delays
2040: 3 intersections operate with excessive delay

Middle and southern subareas **exceed the typical crash rate** for compatible corridors.

3 major intersections have high crash rates

2015-2019
4 fatal crashes
4 pedestrian crashes
6 serious injury crashes

8 Bus Routes serve the project area

The MAPO area had an estimated population of 62,578 in 2012 and 65,175 in 2020, increasing 4%. MAPO projects a **2045 population of 73,200, increasing an additional 12%** from the 2020 estimation.

33% renter occupied housing (34% in Nicollet and Blue Earth Counties)

Areas of high concentration of **minority or low income populations**

37,200 jobs in the MAPO area (2017), of which most drove or carpooled to work.

20% age 65+ in South Bend Township (13% in Nicollet and Blue Earth Counties)

There are social, economic, and environmental resources within the study area including environmental justice populations, potentially contaminated sites, scattered stands of trees, grassy areas, lakes, streams, rivers, ponds, and wetlands. No adverse effects to wildlife is anticipated with construction.

A FEMA controlled levee exists on the river side of Highway 169. The levee is a combination of earthen berm and concrete floodwall providing flood protection for North Mankato, Mankato, and LeHillier when the Minnesota River is at flood stage.

Northern Subarea Findings

The northern subarea runs from Veterans' Memorial Bridge to Lake Street. This segment is a four-lane divided expressway within the Cities of Mankato and North Mankato.

This subarea provides access to the 100 acre Kiwanis Recreation Area and has a large concentration of commercial, heavy industrial, light industrial, residential, and public/institutional land uses served by Lind Street and Webster Avenue connections to Highway 169.

2040 projections show excessive delays at the eastbound Highway 14 exit ramp during AM & PM peak hours.

159 crashes *(2015-2019)*
2 severe crashes
This segment operates within the normal range compared to similar corridors statewide.

Access Management
5 of 7 existing minor road intersections **do not meet recommended spacing.** Future access plans must give consideration to the North Mankato resolution No. 53-19 stating full access must be maintained at Webster Avenue and the Mankato resolution R-19-0708-119 stating that businesses currently served by the Lind Street access must be assured long-term economic vitality.

The Minnesota River Trail runs along Highway 169. This trail provides access within North Mankato and Mankato. There is demand for safe highway crossings to access the trail from Lind Street and Webster Avenue.

Ongoing Land Use Studies for the Riverside North Redevelopment in Mankato and Webster Avenue in North Mankato.

Primary Highway Business District requiring local access for economic vitality of existing and future commercial and industrial businesses.

Middle Subarea Findings

The middle subarea runs from the Blue Earth River crossing to Veterans Memorial Bridge within the Cities of Mankato and North Mankato. This is a four-lane divided freeway corridor. This area includes primarily low and medium density residential and heavy industrial land uses along the eastern edge of the Minnesota River. North Mankato Fire Station #1 has access to Highway 169 via Lookout Drive.

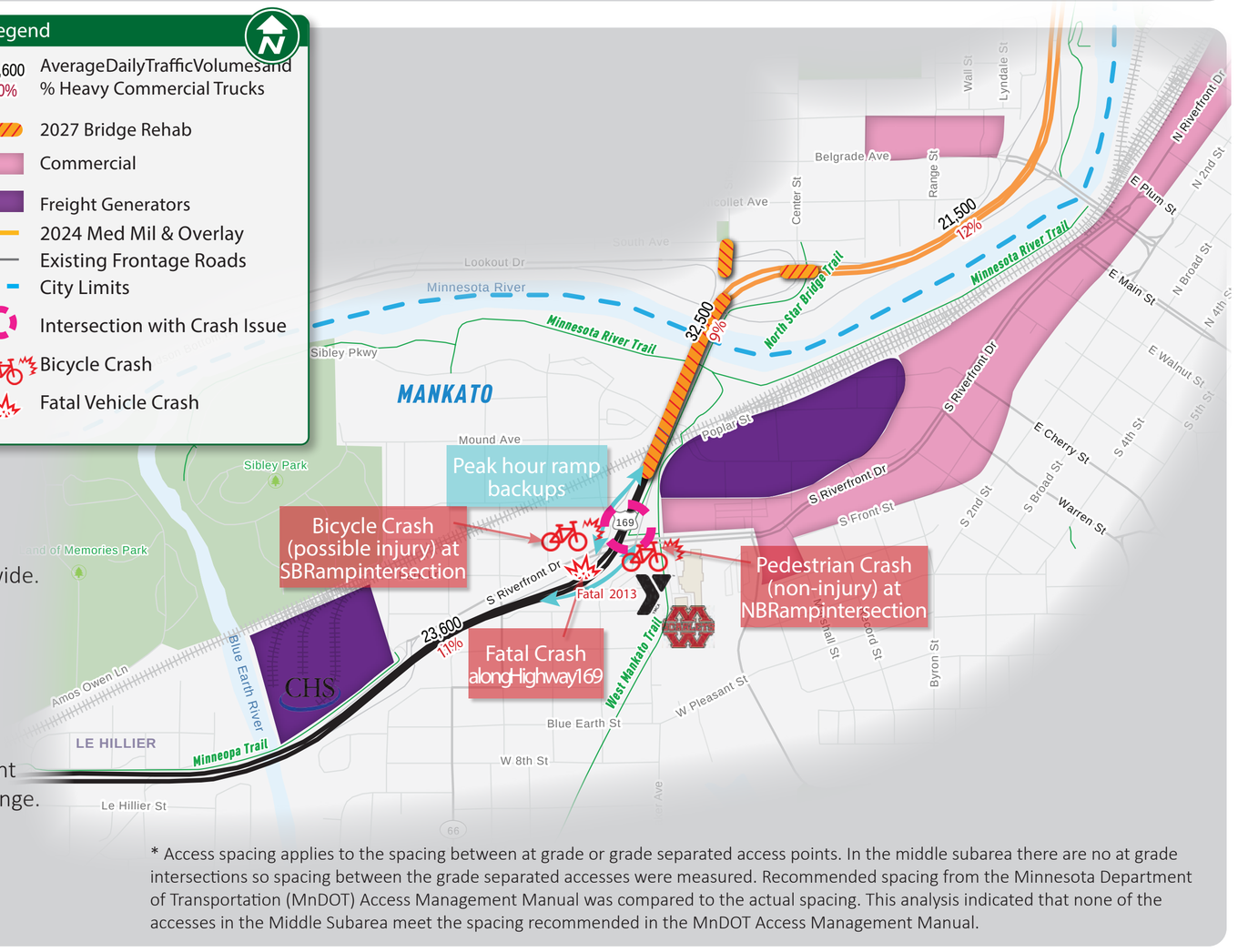
As the only freeway segment in the study area,traffic movements rely heavily on the Veterans Memorial Bridge, Lookout Drive, and South Riverfront Drive interchanges. These interchanges provide critical connections to Downtown Mankato, West Mankato, southern Mankato and Minnesota State University, Mankato campus, lower and upper North Mankato, and across the Minnesota and Blue Earth Rivers.

204 crashes *(2015-2019)* **1 severe crash**
This segment operates **above** the normal range compared to similar corridors statewide.

Access Management
3 of 3 Primary Intersections **do not meet recommended spacing.** 2 of 2 minor road intersections **do not meet recommended spacing.** *

Freight access to industrial areas along the railroad in Mankato occurs at the Riverfront Drive ramp, Riverfront Drive interchange, and the Veteran's Memorial Bridge interchange.

The area is well connected with **existing trails** across the North Star Bridge and along both sides of the Minnesota River.



* Access spacing applies to the spacing between at grade or grade separated access points. In the middle subarea there are no at grade intersections so spacing between the grade separated accesses were measured. Recommended spacing from the Minnesota Department of Transportation (MnDOT) Access Management Manual was compared to the actual spacing. This analysis indicated that none of the accesses in the Middle Subarea meet the spacing recommended in the MnDOT Access Management Manual.

Southern Subarea Findings

The southern subarea runs from Highway 60 to the Blue Earth River crossing within South Bend Township. This is a four-lane divided expressway corridor. This area includes primarily low density residential and park and open space land uses directly adjacent Highway 169, with some areas of commercial and light industrial.

Connectivity of the local roadway network is inhibited in many areas by topography, including steep slopes and natural areas, the Union Pacific Railroad, the Minnesota and Blue Earth Rivers and adjacent land uses. Limited local network connectivity puts pressure on Highway 169 and conversely, any change in access will put pressure on the local system.

2040 projections show back-ups extending beyond the westbound left turn lane at Highway 60 and CSAH 69 (Hawley Street) and excessive delay at the intersection of Highway 60 and 33 during the PM peak hour.

171 crashes *(2015-2019)* **7 severe crashes**
This segment operates **above** the normal range for **fatal and serious injury** crash critical index compared to compatible corridors statewide.

Access Management
2 of 4 Primary Intersections **do not meet recommended spacing.** 10 of 12 minor road intersections **do not meet recommended spacing.**

Freight access is important for the industrial land uses and connections to the county road network.

Trails in this area include the **South Route Trail** and the **Minneopa Trail.** Pedestrian demand is high to connect the residential areas across Highway 169 to the Blue Earth River bridge, one of two access points by bike or foot to West Mankato destinations such as Roosevelt Elementary School, West High School, and Downtown Mankato. There is also an existing at-grade pedestrian crossing at Hawley Street.

Southern Subarea Findings

The southern subarea runs from Highway 60 to the Blue Earth River crossing within South Bend Township. This is a four-lane divided expressway corridor. This area includes primarily low density residential and park and open space land uses directly adjacent Highway 169, with some areas of commercial and light industrial.

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Access Management
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Freight access is important for the industrial land uses and connections to the county road network.

Trails in this area include the **South Route Trail** and the **Minneopa Trail.** Pedestrian demand is high to connect the residential areas across Highway 169 to the Blue Earth River bridge, one of two access points by bike or foot to West Mankato destinations such as Roosevelt Elementary School, West High School, and Downtown Mankato. There is also an existing at-grade pedestrian crossing at Hawley Street.

BOLTON & MENK

Attachment C – Purpose and Need Statement; Goals and Objectives

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Purpose and Need Statement

Date: **August 12, 2020**

To: Charles Androsky, Transportation Planner, MAPO

From: Bob Rogers, SEH

Subject: Purpose and Need Statement
Highway 169 Corridor Study
Mankato/North Mankato Area Planning Organization (MAPO)

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Figures

I. What is Purpose and Need?

This corridor study purpose and need defines the transportation problems or deficiencies along Highway 169 from Highway 60 to Lake Street. The formation of the purpose and need is based upon existing conditions data and stakeholder input received early in the study process. The identification of needs helps build a common focus among stakeholders on the scope and timing of improvements through defining the "who, what, where, why, and when" of the transportation needs. This also provides project partners and stakeholders with direction on the need for additional analysis required in the next phase of the project development process.

The identified needs and opportunities within the study area will also serve as the cornerstone for developing evaluation criteria, which will be used to create and evaluate a full range of alternatives and design options that satisfy the specific project area needs.

Since any major future improvements along the Highway 169 corridor will likely seek federal funding, pertinent Federal Highway Administration (FHWA) transportation purpose and need guidance was used, in part, to help outline transportation needs (and other considerations) in the Highway 169 corridor study area. It is anticipated that standalone purpose and need statements will be required for each future action and that the corridor study needs documented in this corridor study will be utilized to the extent practicable.

A. Study Area Background

The study area is located in the cities of Mankato and North Mankato and includes unincorporated areas in Blue Earth and Nicollet Counties (**Figure 1**). The Highway 169 study limits extend from the Highway 60 intersection on the south to the Lake Street intersection on the north. This segment of Highway 169 is designated as a Principal Arterial, as it serves a critical role in the local and regional transportation system. Within the study area, Highway 169 is a four-lane principal arterial roadway with traffic volumes ranging between approximately 15,500 to over 32,000 daily trips.

Figure 1: Project Area

Highway 169 is an essential route and contributing element to the quality of life and economic vitality of the region by connecting residents and businesses to numerous communities, markets, and other transportation corridors. Beyond serving commuters and commercial freight movements in the study area, Highway 169 provides connections and access to several institutional and recreational facilities. Adjacent land uses vary widely among the three segments of the corridor study area. The northern segment includes a mix of commercial and industrial businesses along with residential developments to the south. The central segment provides freeway level access to the densely developed central business districts of both Mankato and North Mankato. The southern segment transitions from a higher density of mixed uses (commercial, industrial, residential) near the northern portion of this segment to a more scattered mixed use pattern with areas of open space and agricultural land use.

II. Purpose

The purpose of the Highway 169 Corridor Study is to identify context-sensitive transportation improvements along Highway 169 and the local supporting roadway system that will improve vehicle safety, maintain high levels of local and regional traffic operations and enhance pedestrian/bicycle movements and safety throughout the study corridor. Future corridor improvements should also address infrastructure conditions, foster economic growth, and be supported by local jurisdictions through the municipal consent process.

III. Highway 169 Corridor Study Area Needs

This section lists the study area needs that will be refined based on existing conditions data and future conditions analysis. The determination of primary needs, secondary needs, and additional considerations will be completed after review of the data/analysis and in consultation with the PMT.

Primary needs include the transportation problem(s) that have been substantiated and recognized by the project partners as priority issues to be solved. Primary needs lead to the initiation of specific improvements/project(s) that resolve current or future concerns. Secondary needs include other transportation problems or opportunities in the study area that may be able to be addressed, if feasible, at the same time that the primary needs are addressed. Additional considerations are other important factors that may have an influential effect on project decisions or project elements. Below is an assessment of US Highway 169 corridor needs and/or additional considerations. The determination of whether a need is considered primary and/or secondary will be determined on a project by project basis and at the scoping and preliminary design phase of project development.

A. Vehicle Mobility

Corridor Operations

Highway 169 is a four-lane divided section throughout the study area. Daily traffic volumes range between 15,500 to 32,000 trips and heavy commercial vehicle account for 8 to 15 percent of all traffic. The number of daily trips along the corridor falls within the capacity of the highway section

and is generally comparable to other non-metro (Twin Cities) four-lane facilities found throughout Minnesota. The percent of heavy commercial vehicles is slightly above average for similar highways.

The existing peak hour operations were analyzed using Synchro/SimTraffic software. Based on existing travel demand, there are no substantial operational issues related to corridor capacity. Analysis of 2040 No-Build corridor operation shows conditions remaining at acceptable levels. The 2040 forecast average travel speeds are expected to remain the same or decrease slightly over the existing conditions along Highway 169. The northern subarea experiences the biggest decrease in average speed with a 3-4 MPH reduction.

Intersection Operations

Existing Intersection Operations

An analysis of existing AM and PM peak hour intersection operations was conducted in Synchro/SimTraffic to understand delay and queuing issues at nineteen intersections located throughout the project area. Existing signal timing was provided by MnDOT and fleet mix percentages (passenger and heavy commercial vehicles) were obtained from previous traffic counts. The following intersections are signalized throughout the project area:

- Lind Street at Highway 169
- Webster Avenue at Highway 169
- Belgrade Avenue at southbound Highway 169 Ramps
- Belgrade Avenue at northbound Highway 169 Ramps
- Riverfront Drive at southbound Highway 169 Ramps

The average intersection delay is a volume-weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from Level of Service (LOS) A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D are generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that travelers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity resulting in substantial delays. **Table 1**, on the following page, shows the intersection delay as well as the maximum delay of all movements at each intersection.

Based on the results of the existing conditions operational analysis, all intersections operate with acceptable LOS C or better, which are commonly perceived as operating at acceptable levels. A LOS D is still considered acceptable, but is an indicator that an intersection is approaching capacity and that operational conditions are beginning to adversely impact traffic flows.

While the overall intersection delay is considered acceptable throughout the study area intersections, there are several approach movements operating with unacceptable operations (LOS E or F) during the peak hours. These approaches/movements are detailed below and shown in **Table 1**:

- Lake Street NW (north access) at Highway 169: westbound left turns operate with LOS E in the PM peak hour

- Eastbound Highway 14 Exit Ramp at Highway 169: eastbound left turn operates with LOS F in the PM peak hour
- Webster Avenue/Highway 169 signalized intersection: southbound left turn operates at LOS E for both AM and PM peaks
- CSAH 33 at Highway 169: northbound left turn operates at LOS F in both the AM and PM peaks
- Highway 60 at Highway 169: northbound left turn operates with LOS F in the PM peak hour.

Table 1 – Existing Traffic Operations Analysis Results

Intersection	A.M. Peak Hour					P.M. Peak Hour				
	Intersection		Maximum Movement			Intersection		Maximum Movement		
	Delay*	LOS	Mvmt	Delay*	LOS	Delay*	LOS	Mvmt	Delay*	LOS
Lake St NW (North Access) at TH 169	1	A	WBL	27	D	2	A	WBL	41	E
Lake St NW (South Access) at TH 169	1	A	NBL	6	A	1	A	NBL	9	A
WB TH 14 Entrance Ramp at TH 169	1	A	NBL	8	A	2	A	NBL	12	B
EB TH 14 Exit Ramp at TH 169	5	A	EBL	31	D	7	A	EBL	81	F
Lind St at TH 169	16	B	NBL	49	D	18	B	SBL	48	D
River Ln at TH 169	4	A	NBR	8	B	5	A	NBR	9	A
Webster Ave at TH 169	16	B	SBL	69	E	19	B	SBL	64	E
Monroe Ave at TH 169	5	A	EBR	13	B	4	A	EBR	10	B
Belgrade Ave at SB TH 169 Ramps	15	B	SBL	30	C	14	B	SBL	35	D
Belgrade Ave at NB TH 169 Ramps	3	A	NBL	18	B	7	A	NBL	21	B
Owatonna St at SB TH 169 Ramps	3	A	NBT	29	D	3	A	SBT	3	A
Riverfront Dr at SB TH 169 Ramps	23	C	SBL	33	C	21	C	SBL	34	C
Riverfront Dr at NB TH 169 Ramps	6	A	NBL	33	D	5	A	NBL	22	C
CSAH 69 (Hawley St) at TH 169	5	A	WBL	32	D	2	A	WBL	12	C
CSAH 33 at TH 169	3	A	NBL	50	F	21	C	NBL	423	F
TH 68 at TH 169	3	A	SBL	18	C	5	A	SBL	34	D
CSAH 69 (Gadwall Rd) at TH 169	2	A	SBL	16	C	3	A	SBL	26	D
CSAH 90 at TH 169	1	A	WBL	3	A	1	A	WBL	8	A
TH 60 at TH 169	6	A	NBL	28	D	7	A	NBL	145	F

*Delay in seconds per vehicle.

Several traffic queuing issues were also identified in the existing operational analysis. Specific details of each movement/intersection approach is contained in the *Highway 169 Corridor Study – Traffic Operations Evaluation Report.* Below is a summary of problematic queues:

- Lind Street: the maximum northbound queue blocks access to left and right turn lanes during both peak hours and the maximum westbound queues in the AM and PM peak hours extend beyond Lind Court
- Webster Avenue: the maximum eastbound queues in the both AM and PM peaks extends to and beyond the Range Street intersection resulting in operational impacts along Range Street and in some cases blocking driveway access to surrounding businesses. The maximum AM and PM westbound queues extend to River Drive resulting in delays for trips along River Drive
- Belgrade Avenue at Southbound Highway 169 Ramps: the maximum eastbound thru movement queue extends past Nicollet Avenue during both peak hours and the maximum westbound left queue extends beyond the turn lane during the PM peak
- Riverfront Drive at Southbound Highway 169 Ramps: during both the AM and PM peak hours the maximum southbound queues extend past Owatonna Street, however the queues do not extend onto Highway 169
- Riverfront Drive at Northbound 169 Ramps: the maximum westbound queues in AM peak extend through the intersection of Poplar Street and Riverfront Drive whereby impacting traffic operations at this intersections
- CSAH 33 at Highway 169: the maximum northbound queue in the PM peak hour extends approximately 850 feet causing traffic to back up through the Southbend Avenue intersection which is located only 200 feet from the CSAH 33 and Highway 169 intersection.

2040 No-Build Intersection Operations

An analysis of forecast AM and PM peak hour intersection operations was conducted in Synchro/SimTraffic for the same nineteen intersections located throughout the project area. As shown in **Table 2**, the 2040 No-Build operational analysis shows several deficiencies and unacceptable levels of service.

The results of the 2040 No-Build operational analysis indicates that most intersections are anticipated to continue to operate acceptably with LOS C or better except the following intersections which operate with LOS E or F:

- Eastbound Highway 14 Exit Ramp at Highway 169: Intersection operates with LOS D in the AM peak hour and LOS F during the PM peak hour
- Eastbound Highway 14 Exit Ramp at Highway 14: Queues from the eastbound Highway 14 Exit Ramp/Highway 169 intersection back up onto Highway 14 causing the exit ramp (which should be free flowing) to operate with LOS E in the PM peak
- CSAH 33 at Highway 169: The intersection operates at LOS F in the PM peak hour
- Highway 60 at Highway 169: The intersection operates at LOS D in the PM peak hour

Table 2 – 2040 No Build Traffic Operations Analysis Results										
Intersection	A.M. Peak Hour					P.M. Peak Hour				
	Intersection		Maximum Movement			Intersection		Maximum Movement		
	Delay*	LOS	Mvmt	Delay*	LOS	Delay*	LOS	Mvmt	Delay*	LOS
Lake St NW (North Access) at TH 169	2	A	EBL	37	E	4	A	EBL	81	F
Lake St NW (South Access) at TH 169	1	A	NBL	10	A	1	A	NBL	13	B
WB TH 14 Entrance Ramp at TH 169	2	A	NBL	15	B	2	A	NBL	18	C
EB TH 14 Exit Ramp at TH 169	25	D	EBL	204	F	87	F	EBL	926	F
EB TH 14 Exit Ramp at TH 14	1	A	NBR	2	C	43	E	NBR	297	F
Lind St at TH 169	20	C	NBL	52	D	24	C	NBL	51	D
River Ln at TH 169	6	A	NBR	10	B	7	A	WBR	12	B
Webster Ave at TH 169	19	B	SBL	62	E	21	C	SBL	61	E
Monroe Ave at TH 169	6	A	EBR	18	C	5	A	EBR	15	C
Belgrade Ave at SB TH 169 Ramps	17	B	SBL	29	C	16	B	SBL	39	D
Belgrade Ave at NB TH 169 Ramps	4	A	NBL	23	C	9	A	NBL	28	C
Owatonna St at SB TH 169 Ramps	4	A	NBT	23	C	3	A	SBT	3	A
Riverfront Dr at SB TH 169 Ramps	26	C	EBT	32	C	22	C	EBT	31	C
Riverfront Dr at NB TH 169 Ramps	9	A	NBL	46	E	8	A	NBL	33	D
CSAH 69 (Hawley St) at TH 169	16	C	WBL	129	F	2	A	WBL	18	C
CSAH 33 at TH 169	5	A	NBL	148	F	130	F	NBL	1385	F
TH 68 at TH 169	6	A	SBL	46	E	8	A	SBL	70	F
CSAH 69 (Gadwall Rd) at TH 169	3	A	SBL	23	C	3	A	SBL	36	E
CSAH 90 at TH 169	1	A	WBL	6	A	1	A	WBL	12	B
TH 60 at TH 169	7	A	NBL	57	F	25	D	NBL	1200	F

*Delay in seconds per vehicle.

Additionally, several intersection approaches/movements are expected to operate at LOS E or F and numerous problematic traffic queues have been identified under the 2040 No-Build condition. As shown in **Table 2**, eleven intersection approaches in the AM peak hour and nine in the PM peak hour will potentially experience unacceptable (LOS E/F) operating conditions. Specific details of the forecast operations and problematic queuing conditions at the study area intersections is contained in the *Highway 169 Corridor Study – Traffic Operations Evaluation Report*.

System Connectivity

StreetLight® Insight data was used to analyze the origin-destination of trips using the Highway 169 corridor in order to determine the type of trip (local vs. regional) and if there are similarities or differences in travel patterns among the three subareas. The analysis reviewed all vehicles using the highway as well as a separate review of just heavy commercial vehicles/haulers. The full results of the analysis can be found in the *Highway 169 Corridor Study – Origin-Destination Assessment for the Existing Conditions & No-Build Conditions Report*.

The StreetLight data indicates that the majority of vehicles passing through the Northern Subarea (62% all vehicles and 39% trucks) and Middle Subarea (69% all vehicles and 37% trucks) are local trips destined for locations within the Mankato and North Mankato. Approximately 43% of all vehicles and 30% of heavy commercial trucks passing through the Southern Subarea were shown to have local destinations in the Mankato and North Mankato area. These findings emphasize the need for safe and efficient connections between Highway 169 and the local arterial system in order to effectively serve the existing and future travel demands and patterns.

A more detailed review of trips with destinations in the Northern and Southern Subareas was also conducted. The main trends of the daily travel patterns are summarized below:

Northern Subarea:

- *All Vehicle Traffic* – 62% of all traffic passing through the northern subarea are destined for North Mankato and Mankato. The primary destinations of northbound Highway 169 traffic include Belgrade Avenue east of Highway 169 (29%), Highway 14 east of Highway 169 (21%) and through trips continuing north of Lake Street (22%). Similarly, the primary destinations of southbound Highway 169 traffic include Belgrade Avenue east of Highway 169 (16%), Highway 14 east of Highway 169 (14%), Highway 14 west of Highway 169 (14%), and through trips continuing south of Belgrade Avenue (35%).

- *Heavy Commercial Traffic* – 39% of all freight traffic passing through the northern subarea are destined for Blue Earth County and Nicollet County. The main destinations of northbound trucks on Highway 169 include Highway 14 east of Highway 169 (27%) and through trips continuing north of Lake Street (45%). Southbound truck destinations include Highway 14 east of Highway 169 (13%) and through trips continuing south of Belgrade Ave (57%).

This analysis indicates that most of the heavy commercial vehicle traffic in the northern subarea remains on Highways 169 and 14, with Belgrade Ave east of Highway 169 being another important destination for both northbound and southbound Highway 169 traffic.

Southern Subarea:

- *All Vehicle Traffic* – 43% of all traffic passing through the southern subarea are destined for North Mankato and Mankato. The majority of traffic remains on Highway 169 throughout the entire subarea (74%). The only other roadways with more than 2% of the traffic include Highway 60 west of Highway 169 (5%), CSAH 90 (5%), and CSAH 33 (6%). The southbound destinations differ slightly with the primary destinations being CSAH 69/Hawley Street (19%), CSAH 33 (10%), Highway 68 (10%), Highway 169 south of Highway 60 (9%), and Highway 60 west of Highway 169 (41%).

- *Heavy Commercial Traffic* – 30% of the freight traffic passing through the southern subarea are destine for North Mankato and Mankato. Most northbound traffic remains on Highway 169 throughout the entire subarea (76%), while 11% are destine west of Highway 60, 3% connect to CSAH 90, and 5% are destined to Highway 68. Most of the southbound trips end up along Highway 60 west of Highway 169 (83%) with other roadways having lesser of a draw with Highway 169 south of Highway 60 receiving 6%, Highway 68 attracting 3%, and approximately 4% destine to CSAH 69/Hawley Street.

This analysis indicates that most of the traffic remains on Highway 169 or Highway 60 throughout the southern subarea, but the all vehicle analysis showed that CSAH 69/Hawley St and CSAH 33 are also popular destinations for southbound Highway 169 traffic in addition to Highways 60 and 169.

B. Vehicle Safety

Vehicle safety is a primary need throughout the corridor study area. A safety assessment was completed to determine "hot spots" along Highway 169 where crash history data identifies safety concerns. The safety analysis included a review of five year (2015-2019) crash data at intersections, interchanges, and along the highway segments. In addition to vehicle crashes, the analysis also considered pedestrian and bicycle crashes. A complete summary of the safety assessment can be found in the *Highway 169 Corridor Study – Existing and Future Safety Evaluation Report.*

Intersection Crash Analysis

A crash analysis, utilizing five year crash data (2015-2019), was completed for fifteen intersections located throughout the study area. The following Highway 169 intersections or interchange ramp terminal intersections were included in the crash analysis:

- Lake Street NW Northern Access: at-grade intersection with side street stop control
- Lake Street NW Southern Access : at-grade intersection with side street stop control
- Lind Street: at-grade signalized intersection
- Webster Avenue: at-grade signalized intersection
- Belgrade Avenue at Southbound Ramps: signalized intersection
- Belgrade Avenue at Northbound Ramps: signalized intersection
- Riverfront Drive at Northbound Ramps: stop control for exit ramp
- Riverfront Drive at Southbound Ramps: signalized intersection
- Hawley Street/CSAH 69: at-grade intersection with side street stop/yield control
- Hemlock Road/CSAH 33: at-grade intersection with side street stop/yield control
- Highway 68: at-grade intersection with side street stop control
- Gadwall Road/CSAH 69: at-grade intersection with side street stop control
- Loren Drive: at-grade intersection with side street stop control
- Gadwall Road West /CSAH 69: at-grade intersection with side street stop control
- Highway 60: at-grade intersection with side street stop/yield control

The intersection crash analysis shows that three intersections have statistically significant safety concerns with critical index values greater than one (see **Table 3**). Another location of interest is the Hawley Street/CSAH 69 intersection, which has a critical index less than one but has a fatal and serious injury index of 1.07 for the five year reporting period.

Table 3 – Intersections with Safety Concerns						
Intersection	**Total Crashes**	**Severe Crashes (K + A)**	**Actual Crash Rate**	**Statewide Average**	**Critical Rate**	**Critical Index**
Lind Street at Highway 169[a]	70	1	1.45	0.45	0.71	**2.04**
Riverfront Dr. at NB Highway 169 Ramps[b]	19	0	0.49	0.18	0.37	**1.32**
Highway 68 at Highway 169[c]	17	2	0.38	0.18	0.36	**1.06**
[a] *located in Northern Subarea* [b] *located in Middle Subarea* [c] *located in Southern Subarea*						

While all three intersections demonstrate localized safety concerns, the Lind Street intersection is especially concerning with a crash rate over three times the statewide average for similar intersections and a critical index value of 2.04.

Interchange Crash Analysis

Safety conditions over the five year analysis period (2015-2019) at the Highway 14, Belgrade Avenue, Lookout Drive, Riverfront Drive, and Hawthorn Road/CSAH 90 interchanges were also evaluated. Since ramp merge areas are not considered a typical intersection type or highway segment, crashes within these interchange ramp areas were reviewed for crash trends.

Highway 169/Highway 14 Interchange

During the five year reporting period there were a total of 22 reported crashes at the interchange. The data indicates that most crashes resulted in property damage, however three minor injury and five possible injury crashes were reported. Additional crash information and trends can be found in the *Highway 169 Corridor Study – Existing and Future Safety Evaluation Report.*

Photo taken along Highway 14 WB exit ramp to NB Highway 169. *Source: Google Maps*

Belgrade Avenue Interchange

Three crashes were reported during the five-year study period. All of which were run off the road type crashes, one of which resulted in a "possible injury" crash.

Highway 169/Lookout Drive Interchange

From 2015 to 2019 there were 19 reported crashes at the Highway 169/Lookout Drive interchange. The location of the crashes and trends in crash types are summarized below.

- 11 crashes were along the northbound Highway 169 exit ramp to Lookout Drive
- 4 crashes were along the southbound Highway 169 exit ramp to Lookout Drive
- 2 crashes were along the entrance ramp to northbound Highway 169
- 2 crashes were long the entrance ramp to southbound Highway 169

Of the 19 reported crashes, 15 involved vehicles that ran off the road while traversing the ramps at this interchange. The majority of crashes (13 of 19) involved property damage only, 2 had possible injuries, and 4 involved minor injuries.

Riverfront Drive Interchange

During the five year reporting period there were a total of 11 reported crashes at the merge/diverge areas of the interchange. The data indicates that most crashes resulted in property damage, however one possible injury crash was reported.

Highway 169/Hawthorn Road (CSAH 90) Interchange

From 2015 to 2019 there were four reported crashes at the Hawthorn Road/CSAH 90 interchange. One of the crashes resulted in a fatality of a motorcycle that was merging onto northbound Highway 169 from westbound Hawthorn Road/CSAH 90 and collided with another vehicle. The other three crashes resulted in property damage only. Two of the property damage crashes involved vehicles attempting to turn left onto Hawthorn Road/CSAH 90 from southbound Highway 169 and the third involved a vehicle merging onto southbound Highway 169.

Segment Crash Analysis

A segment crash analysis for the three Highway 169 subareas/segments was completed using the five year crash data from 2015-2019. The limit of each subarea is described below:

- *Northern Subarea* – covers the portion of the study area from Lake Street on the north to the Veterans' Memorial Bridge/Belgrade Avenue on the south. This approximately 2 mile segment is a four-lane divided expressway with a speed limit of 50 mph
- *Middle Subarea* – runs from the Veterans' Memorial Bridge/Belgrade Avenue to the Blue Earth River crossing. This 2.3 mile segment is a four-lane freeway corridor with a speed limit of 50 mph
- *Southern Subarea* – covers the portion of the study area from the Blue Earth River crossing to southern study limit at Highway 60. This 4.4 mile segment is a four-lane expressway with speed limits ranging from 50 mph to 65 mph.

All three subareas were analyzed with and without intersection related crashes. The analysis shows that without the intersection related crashes included, none of the segments appear to have a

crash issue, but there is a high frequency of crashes spread out along each subarea. The most common crash type in all three subareas is run off the road crashes (54% in the northern subarea, 67% in the middle subarea, and 57% in the southern subarea).

An assessment was also completed that added in the intersection related crashes. This shows that the middle subarea operates with a critical index of 1.09, which indicates a safety concern. Also, the southern subarea has seven severe crashes and a fatal and serious injury critical index of 1.03. This indicates that the southern segment is operating above the normal range for fatal and serious injury crashes compared to similar roadway segments statewide.

Contributing Conditions

The physical characteristics of highways, interchanges, and intersections can contribute to safety issues. Below is a list of geometric conditions that may have contributed to past safety concerns.

- Westbound Highway 14 to northbound Highway 169 Exit Ramp – two reported crashes along the westbound Highway 14 exit ramp to northbound Highway 169 both involved a vehicle that crossed over the solid white lines along the ramp and northbound 169 travel lanes while attempting to get back onto westbound Highway 14 via the left turn from northbound Highway 169 to the westbound Highway 14 entrance ramp. The photo displayed on page 10 depicts this area. There is a sign along the exit ramp that shows this left turn movement prohibited and pavement striping is present restricting this movement, however these crashes indicate that the sign and paint prohibiting this movement might not be sufficient.

- Riverfront Drive at northbound Highway 169 Entrance Ramp – five rear end crashes have occurred as vehicles were turning right onto the northbound Highway 169 entrance ramp. Westbound right turns are required to yield to eastbound vehicles, but these crashes indicate that vehicles are not always anticipating the need to stop and yield to other traffic. With the right turn channelized and the non-signalized intersection, vehicles may be incorrectly assuming they have the right of way and therefore are not expecting the vehicle in front of them to stop for oncoming traffic.

- Highway 68 at Highway 169 – six right angle crashes have occurred involving vehicles attempting to turn left from Highway 68 onto northbound Highway 169 that were struck by a vehicle in the southbound direction along Highway 169. Several injuries and a fatality have resulted due in part to speeds of 65 mph along this portion of Highway 169 and the intersection sight distance for the left turn movement from TH 68 onto TH 169 being approximately 25 percent less than the recommended distance of 720 feet. This distance is not met for southbound Highway 169 traffic due to the vertical curvature of the roadway.

Another key component can be the inadequate spacing of access points, especially where heavy entering/exiting volumes exist, which can lead to considerable weaving problems and conflicts between faster moving thru trips and slower moving vehicle entering/exiting the highway. As shown in **Table 4,** the distance between access points in the study area rarely complies with the recommended spacing distances listed in MnDOT's Access Management Manual. Additional access information for the study area can be found in the *Highway 169 Corridor Study – Existing Conditions and No-Build Conditions Report*.

Table 4 – Spacing Between Highway 169 Corridor Study Access Points			
Spacing Between Primary Intersections			
Primary Intersections[1]	**Miles**	**Recommended Spacing (Miles)**	**Meets Spacing Recommendation**
Highway 14 to Webster Avenue	0.64	0.5	Yes
Webster Avenue to Belgrade Avenue	0.60	0.5	Yes
Belgrade Avenue to Lookout Drive	0.09	1	No
Lookout Drive to Riverfront Drive	0.13	1	No
Riverfront Drive to CSAH 69 (Hawley Street)	0.74	1	No
CSAH 69 (Hawley Street) to CSAH 33	0.57	1	No
CSAH 33 to Highway 68	0.68	1	No
Highway 68 to CSAH 90	1.2	1	Yes
CSAH 90 to Highway 60	1.4	1	Yes
Spacing Between Secondary Intersections[1]			
Secondary Intersection	**Miles**	**Recommended Spacing (Miles)**	**Meets Spacing Recommendation**
Lake Street (North) to Lake Street (South)	0.02	0.5	No
Lake Street (South) to Highway 14	0.16	0.5	No
Highway 14 to Lind Street	0.08	0.5	No
Lind Street to River Lane	0.14	0.25	No
River Lane to Webster Avenue	0.44	0.25	Yes
Webster Avenue to Monroe Avenue	0.45	0.25	Yes
Monroe Avenue to Belgrade Avenue	0.15	0.25	No
Riverfront Drive to Woodland Avenue	0.42	0.5	No
Woodland Avenue to CSAH 69 (Hawley Street)	0.32	0.5	No
CSAH 69 (Hawley Street) to Amos Owen Lane	0.19	0.5	No
Amos Owen Lane to CSAH 33	0.38	0.5	No
CSAH 33 to Bison Street	0.50	0.5	Yes
Bison Street to Highway 68	0.18	0.5	No
Highway 68 to 211th Lane	0.32	0.5	No
211th Lane to CSAH 69 (Gadwall Road)	0.14	0.5	No
CSAH 69 (Gadwall Road) to CSAH 120	0.47	0.5	No
CSAH 120 to CSAH 90	0.26	0.5	No
CSAH 90 to CSAH 117	0.10	0.5	No
CSAH 117 to Loren Drive	1.02	0.5	Yes
Loren Drive to CSAH 69 (Gadwall Road)	0.14	0.5	No
CSAH 69 (Gadwall Road) to Highway 60	0.14	0.5	No

A primary intersection refers to a junction between two major roads and a secondary access refers to a junction between a major road and a minor road or local street. Based on the definitions I categorized the intersections based on the functional classification. Since Lind St is classified as a local roadway I believe it should be considered a secondary intersection.

As shown in above, only 4 of the 9 primary intersections and 4 of the 21 secondary intersections along Highway 169 meet the recommended spacing distance. It should be noted that the 211th Lane and Loren Drive intersection are technically local roadways, but they only serve a few businesses and therefore could be classified as driveways; however, they were analyzed as secondary access points as they both provide full access to Highway 169.

C. Modal Interrelationships

Regional Freight Movements

A number of freight generating businesses/developments have been identified throughout the study corridor. According to 2019 traffic data, heavy commercial vehicles account for approximately 8 to 15 percent of all trips on Highway 169. The percentage of trucks has increased in the latest traffic counts by as much as five percent. This increase may in part be connected to recent capacity improvements along Highway 60 southwest of the study area.

Safe and reliable access to freight generating developments as well as efficient connections to the extensive county road network is important to the long term viability of these industries to deliver and receive goods to/from regional markets outside the study area. While existing access conditions appear to adequately serve freight operations, there are local circulation issues, intersection geometry constraints, and connectivity opportunities within all three corridor subareas that need to be considered in evaluating future improvements in order to ensure safe and efficient freight movements to current and future commercial, industrial, and manufacturing land uses. Below is a brief description of the important freight access points and routes within each subarea of the corridor study area:

- *North Subarea* – the Lake Street, Lind Street, Webster Street intersections and Belgrade Avenue interchange provide sufficient access for freight movements. Range Street (west) and North River Drive (east) serve as frontage/backage roads along Highway 169, allowing heavy commercial vehicles to efficiently access existing and future freight dependent developments. In several locations the existing geometrics (lane/shoulder widths, sight distance, lack of turn lanes, and turning radii) creates challenges for freight movements.

- *Middle Subarea* – the Riverfront Drive interchange provides access to several commercial and industrial/manufacturing nodes in this portion of the study area. Riverfront Drive, Poplar Street, Front Street, and Sibley Parkway are a few of the primary local roadways connecting freight movements to Highway 169 and other county roads. The presence of the railroad corridor, the Minnesota River and Blue Earth River have contributed to the challenge of creating efficient and direct connections between land uses. Intersection geometry, congestion, and traffic control also present a variety of constraints for freight movements in this subarea. Future improvements shall evaluate the effectiveness of removing these barriers/constraints that currently affect freight operations.

- *South Subarea* – the Hawley Street, County Road 33, Highway 68, and County Road 69 are the primary intersections that provide access for heavy commercial vehicles to larger freight generating businesses in the south subarea. Several other full and partial access points existing in this subarea that are used by freight traffic. All at-grade access points along a higher speed arterial roadway can present safety and mobility issues for slower

moving freight vehicles to enter and exit Highway 169. While right and left turn lanes exist at the major intersections, only the Highway 68 and County Road 33 intersections have acceleration lanes for heavy trucks to utilize while getting up to speed on Highway 169.

Walkability/Bikeability

Within the study area communities, there are many destinations for pedestrians and bicyclists to travel to/from. Facilities within the pedestrian network include sidewalks, multi-use (shared-use) trails, and pedestrian crossing infrastructure. Facilities within the bicycle network include on-street bikeways and off-street bikeways or multi-use trails. The communities of Mankato and North Mankato have robust park and public space networks, residential neighborhoods, and commercial/industrial nodes.

The area surrounding the Highway 169 corridor study area includes several existing local and regional pedestrian/bicycle facilities that provide non-motorized vehicles access to many local destinations. Complete descriptions of existing facilities and maps illustrating the existing and planned network of sidewalks and trails can be found in the *Highway 169 Corridor Study Existing Conditions Report*.

Listed below is a summary of pedestrian and bicycle facility needs within the study area. These system needs are further discussed and mapped in the *Highway 169 Corridor Study Existing Conditions Report.*

- *ADA Compliant Features* – several trails that cross Highway 169 are currently not ADA compliant. This is the case at Lind Street, Webster Avenue, Riverfront Drive, CSAH 69, and Highway 14

- *System Gaps/Barriers* – connectivity for pedestrian and bicycle movements is a need within the study area as higher speed highway corridors such as Highway 169 and waterways such as the Minnesota River and Blue Earth River can create barriers for non-motorized travelers to cross unless existing bridges are designed to accommodate these movements. Currently only the Belgrade Avenue Bridge over Highway 169, the Highway 169 (North Star Bridge) over the Minnesota River, and Highway 169 Blue Earth River Bridge have dedicated pedestrian/bicycle facilities.

  Several gaps and missing connections have been identified through planning studies completed by the municipalities within the Highway 169 corridor study area:

  - A key missing connection exists in the north subarea where trails exist along both the east and west sides of the Minnesota River, but no connection exists across the river. This limits access to surrounding recreational features, area destinations, and an efficient connection between the West River Trail and the Minnesota River Trail.

  - Highway 169 creates a barrier for pedestrian/bicycle crossing at the Hawley Street (CSAH 69) and Highway 169 intersection due to the need to connect the residential areas both north and south of the highway to local destinations and to the Minneopa Trail for access across the Blue Earth River Bridge. A striped crosswalk was removed from this location due to safety concerns; yet demand continues to exist for crossing the highway in this location.

- The trail on the Blue Earth River Bridge is the only east/west pedestrian and bicycle facility into West Mankato and to destinations such as Roosevelt Elementary School, West High School, and commercial/business developments. The next closest crossing is located approximately two miles downstream at the Hawthorn Road (CSAH 90) bridge across the Blue Earth River.

Pedestrian and Bicycle Crashes

A crash analysis showed there were four crashes involving a pedestrian or bicyclists over the last ten years (2010-2019) in the study area. While the frequency and severity of crashes involving these vulnerable modes of travel does not demonstrate a substantial safety concern

- Pedestrian Crashes – a serious injury crash was reported along Highway 169 between River Lane and Webster Avenue where a pedestrian was struck walking along the shoulder of Highway 169. A second pedestrian crash involved possible injuries and was reported at the Highway 169 and Webster Avenue intersection.
- Bicycle Crashes – two crashes involving bicyclists were reported in the study area. A non-injury crash was reported at the intersection of Riverfront Drive and the northbound Highway 169 ramp terminal intersection and a possible injury crash occurred at the intersection of Riverfront Drive and the southbound Highway 169 ramp terminal intersection.

D. Infrastructure Conditions

Bridge Conditions

Bridge conditions is a transportation need as three bridges in the Highway 169 corridor study area that have been planned for improvements/preservation work to be completed in 2027. The following bridges in the study area are included in the District 7 10-Year Capital Highway Investment Plan (Draft 2021-2030):

- Bridge No. 52012 – Northbound and southbound Highway 169 bridge over northbound Highway 169 exit ramp to Lookout Drive/Center Street
- Bridge No. 07029 – Northbound and southbound Highway 169 bridge over Riverfront Drive
- Bridge No. 9098 – Northbound and southbound Highway 169 bridge over Minnesota River, Union Pacific Railroad, and Sibley Parkway

Two additional bridges along Highway 169 have been recognized for future rehabilitation improvements, but not set timeframe for completion has been identified at this time:

- Bridge No. 52008 – Southbound Highway 169 exit ramp bridge to Lookout Drive (over Sherman Street/Highway 169 southbound entrance ramp)
- Bridge No. 52011 – Southbound Highway 169 exit ramp bridge to Lookout Drive (over northbound Highway 169 exit ramp to Lookout Drive/Center Street)

Table 5 shows the existing conditions of the five bridges identified for preservation/rehabilitation improvements.

Table 5: Highway 169 Corridor Study Bridges with Planned Improvements					
Bridge Characteristics	**Bridge 52008** SB Hwy 169 exit ramp to Lookout Drive (over Sherman St.)	**Bridge 52011** SB Hwy 169 exit to Lookout Dr. (over Hwy 169 exit to Lookout Dr/Center St)	**Bridge 52012** Hwy 169 exit ramp to Lookout Dr.	**Bridge 9098** NB/SB Hwy 169 over MN River, UP RR, Sibley Pkwy	**Bridge 07029** NB/SB Hwy 169 over Riverfront Dr
Year Built	1992	1992	1992	1960	1992
Inspection Date	July 2018	July 2018	August 2018	May 2018	August 2018
Vertical Clearance	No restrictions	No Restrictions	No restrictions	No restrictions	No restrictions
Deficient Status[1]	Adequate	Adequate	Adequate	Adequate	Adequate
Sufficiency Rating[2]	95.7	99.8	93.0	95.9	93.4
[1]Vertical clearances with no restrictions indicate bridges that meet new bridge construction standards: minimum 16'-4" vertical clearance for bridges carrying roadways over highways and 17'-4" for bridges carrying trails only over highways. [2]Sufficiency rating is a percentage scale of 0-100 (100% being entirely sufficient). Generally, to be eligible for bridge rehabilitation, a sufficiency rating of 80% or less is required, and to be eligible for bridge replacement, a sufficiency rating of 50% or less.					
NBI Condition Rating[4]					
Deck	7	8	7	6	6
Superstructure	7	7	8	6	7
Substructure	7	7	7	6	7
NBI Appraisal Rating[4]					
Structure Evaluation	7	7	7	6	7
Deck Geometry	6	6	9	9	9
Under-Clearances	4	6	4	5	6
Waterway Adequacy	NA	NA	NA	9	NA
Approach Alignment	8	8	8	8	8
[4]National Bridge Inventory (NBI) ratings range from 0 to 9, with 0 being a failed condition, and 9 being an excellent condition (such as newly constructed). NBI Condition and Appraisal Ratings with values of 4 or less are highlighted in yellow in the table. A value of "4" indicates a rating of "poor," and a value of "3" indicates a serious condition.					

Table Note: Data obtained from each bridge's 2018 Structural Inventory Report, the most recent available data, generated after the latest inspections in 2018. Additional information on ratings can be found in MnDOT's Bridge Inspection Manual.

Bridge Improvement Needs

The bridge improvements listed in the District 7 10-year Capital Highway Improvement Plan (CHIP) will be further scoped by MnDOT as projects are moved from the CHIP to the current 5-year State Transportation Improvement Program (STIP).

Highway 169 bridge improvements from approximately Riverfront Drive to Lake Street (2027 planned) include roadway and bridge rehabilitation, including major work on the Northstar Bridge. MnDOT has also indicated that within the next 10-15 years it is anticipated that Bridge 07023 (Highway 14 over Highway 169) and Bridge 07011 (Highway 14 over Minnesota River and UP Railroad) will likely require rehabilitation work. The corridor vision established as part of the Highway 169 Corridor Study and additional transportation needs of the region will be used to inform future investments.

Pavement Conditions

Pavement conditions are an important component for maintaining safe driving conditions. Segments where the pavement experiences fatigue/alligator cracking, potholes with patching, and transverse or longitudinal cracking can compromises the smoothness of the driving surface . This in turn can result in loss of vehicle control, a reduction in a driver's or bicyclist's ability to perform maneuvering tasks, and can increase the frequency of lost loads and debris on the roadway.

Pavement Indices

MnDOT uses four indices for reported pavement conditions. Each index describes a different aspect of pavement conditions and can be used to rank pavement sections and predict the need for future maintenance and rehabilitation. The MnDOT pavement condition indices are described in **Table 6**.

Table 6: Pavement Condition Indices

Index	Description	Rating Scale
Ride Quality Index (RQI)	MnDOT's ride, or smoothness, index. RQI reflects the "seat of the pants" feeling the average user experiences traveling down the roadway.	RQI ratings range from 0.0 to 5.0, with 0.0 being considered very poor and 5.0 being considered very good.
Pavement Surface Rating (SR)	MnDOT uses SR to describe pavement distress. Pavement distresses are visible defects on the pavement surface. These defects are symptoms that indicate problems of pavement deterioration.	SR ratings range from 0.0 to 4.0. A higher SR rating indicates a road in better condition. A road with no defects is rated at 4.0. A road in need of major repair or rehabilitation will have an SR rating of near or below 2.5.
Pavement Quality Index (PQI)	MnDOT uses PQI as an overall measure of pavement condition, taking into account both smoothness and cracking	PQI ratings range from 0.0 to 4.5. A higher PQI rating indicates a better overall condition of the roadway.
Remaining Service Life (RSL)	RSL is an estimate, in years, until the RQI will reach a value of 2.5, which is generally considered the end of a pavement's design life. Most pavements will need some type of major rehabilitation when the RQI has reached 2.5	RSL is considered "high" when the number of years until reaching an RQI of 2.5 is 12 or more years. RSL is considered "low" when the number of years until reaching an RQI of 2.5 is 0 to 3 years.

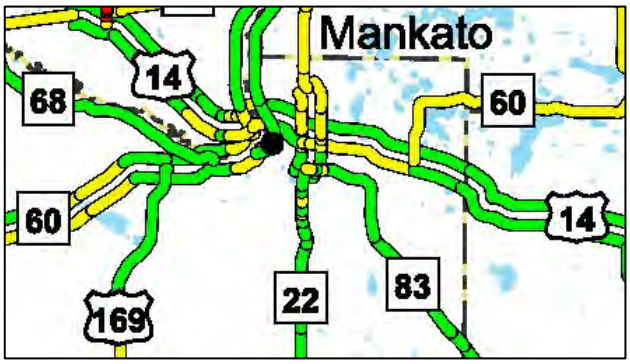
Every year, the MnDOT Pavement Management Unit collects pavement roughness and digital image data of all the highways on the entire state trunk highway system. From this information, pavement condition indices are calculated and mapped for each MnDOT district. The pavement conditions along the Highway 169 study corridor are briefly described below and illustrated in ***Figure 2***.

- The Ride Quality Index (RQI) along the study segment of Highway 169 ranges from fair (2.1 to 3.0) to good (3.1 to 5.0) conditions. The southbound lanes in the North and Middle Subareas are generally rates as "fair" and the South Subarea is rated "good". The northbound lanes of Highway 169 are rated as "good", with the exception of a portion of the Middle Subarea (see Figure 2). MnDOT's criterion for pavement preservation is generally an RQI between 2.5 to 3.0, depending on the type of roadway facility. As a result, there future pavement preservation needs anticipated in the study area.
- The Pavement Surface Rating (SR) is consistently good (2.5 to 4.0) throughout the study corridor.

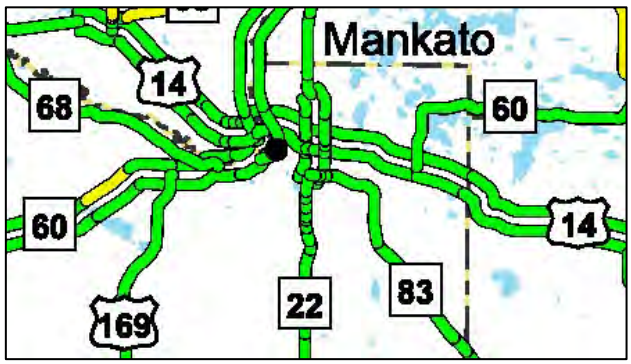
Figure 2: Highway 169 Study Corridor RQI and RSL
(Source: MnDOT Pavement Management Unit, 2019)

DEPARTMENT OF TRANSPORTATION

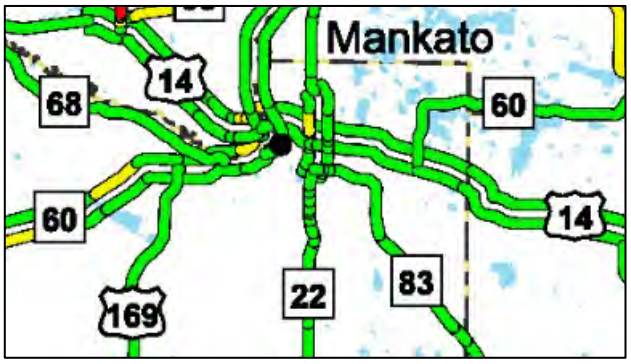
ATP 7
2019 Pavement Condition
Ride Quality Index (RQI)
- Poor (0.0 - 2.0)
- Fair (2.1 - 3.0)
- Good (3.1 - 5.0)



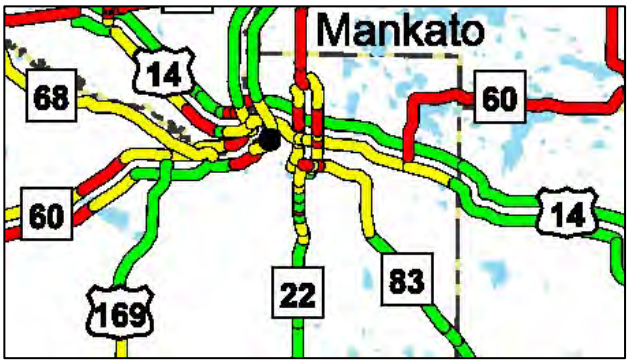
ATP 7
2019 Pavement Condition
Surface Rating (SR)
- Poor (0.0 - 1.6)
- Fair (1.7 - 2.4)
- Good (2.5 - 4.0)



ATP 7
2019 Pavement Condition
Pavement Quality Index (PQI)
- Poor (0.0 - 1.8)
- Fair (1.9 - 2.7)
- Good (2.8 - 4.5)



ATP 7
2019 Pavement Condition
Remaining Service Life (RSL)
- Low (0 - 3 years)
- Medium (4 - 11 years)
- High (12+ years)



- The Pavement Quality Index (PQI) is generally good (2.5 to 4.0) throughout the majority of the study corridor. A short segment along southbound Highway 169 through Mankato/North Mankato was categorized as "fair" (1.9 to 2.7).
- The northbound lanes of Highway 169 in the South Subarea received a "good" rating for Remaining Service Life (RSL), meaning the pavement has 12-plus years of life. Portions on both northbound and southbound Highway 169 through the Middle Subarea have Remaining Service Life (RSL) ratings as "poor", meaning the pavement has less than 3 years of remaining service and is in need of improvements. The other segments of Highway 169 in the study area received "fair" (4 to 11 years) ratings, which indicate improvements are not needed in the short term but should be monitored for deteriorating conditions.

Planned Pavement Improvements

Within the Highway 169 corridor study area there is one programmed pavement improvement/preservation project scheduled for 2024, which is listed in the District 7 10-Year Capital Highway Investment Plan (2019-2028).

A. Additional Considerations: Social, Economic, and Environmental Factors

This section is intended to provide a high level description of the existing conditions and potential SEE factors within the Highway 169 study area that will need to be considered as alternatives are developed and evaluated as part of the project development process. This section is not an in-depth analysis and the topics to be considered during future phases of project development will depending on the scope of planned projects and the type of funding being used, as a project may be required to undertake state and/or federal environmental review.

A more detailed inventory and assessment of the SEE factors associated with the study area can be found in the *"Highway 169 Environmental Screening Report" and the "Highway 169 Environmental Justice Analysis Report".*

An important social factor needing to be considered early in alternatives development is the presence of Environmental Justice (EJ) populations as all federal actions are required to comply with Executive Order 12898[1]. EJ populations are minority and/or low-income populations that are meaningfully greater than those of the general population. For EJ, "meaningfully greater" is defined as a minority or low-income population that is either 10 percent higher than the county average, or greater than 50 percent of the total geographic unit, or determined based on input from local officials or stakeholders.

Social

Based on a review of U.S. Census data – 2017 American Community Survey 5-year Estimates, there are minority and low-income EJ populations present in the corridor study area. Further determination will be needed on a project basis to determine if these populations have the potential to experience disproportional impacts as a result of a federal action or construction activity. Generally, permanent impacts of transportation projects are intended to improve the transportation corridor for all users. While future improvements to the Highway 169 corridor would

[1] https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf

unlikely disproportionately impact any of the identified environmental justice populations, a robust public/stakeholder engagement effort is strongly recommended in future stages of the project development process and prior to the evaluation of alternatives.

Stakeholder Support

In 2019, the Highway 169 Corridor Study Project Management Team (PMT) was formed, which consists of representatives from the cities, counties, MnDOT, and FHWA. The PMT is tasked with guiding the study process and serving as a conduit to their governing bodies and constituents. A goal of the PMT is to develop a unified vision for transportation priorities/recommendations that are locally accepted in order to pursue funding and future municipal consent.

Economic

Highway 169 is an important route for commuters, tourists, and commercial freight travel across southwestern Minnesota. As shown in the traffic analysis section, the corridor continues to grow in use and travel demand, which along with safe and efficient access to commerce destinations (retail shops, restaurants, entertainment, office, and manufacturing/industry) are key factors in the long-term vitality of the local and regional economies.

Traffic counts collected through MnDOT and StreetLight® data from 2019 indicate that heavy commercial truck volumes account for approximately 8 to 15 percent of all daily traffic using Highway 169. This percentage of traffic is greater than the statewide average of approximately 8 percent on the state trunk highway system. As part of the project development process, a Project Management Team (PMT) was formed that consists of representatives from the local units of government (Mankato Area Planning Organization, MnDOT-District 7 Mankato, Blue Earth County, Nicollet County and Cities of North Mankato and Mankato). These stakeholders have mentioned Highway 169 as a critical connection to deliver goods to local businesses and throughout the region and state. Concerns have been raised that the existing highway facility is limiting potential growth and the efficient movement of heavy freight traffic. Operational and safety benefits for freight operators can translate into real dollar savings for businesses that ship items via commercial trucking. By reducing freight shipping costs, a real efficiency benefit can accrue to the business shipping the product, and a potential cost savings can be realized by the receiving business. Shipping cost savings can lower the overall product cost for consumers, in turn making local businesses more competitive compared with their outside competition, and better able to expand to new markets.

In addition to the business expansion benefit related to shipping cost savings, highway improvements can extend the market area that businesses can serve, as well as the areas from which they can access customers and/or suppliers. By extending the distance range over which local businesses effectively compete with their regional or state competitors can provide opportunities for substantial market expansion and attraction of manufacturing and distribution industries. Trajectory

Investments in transportation-related improvements result in several types of economic impacts. The magnitude of the economic impact is most influenced by increased traffic speed and the relative change in travel time. Providing safe, reliable, and efficient travel along and across the

Highway 169 corridor will promote economic competitiveness and expand employment opportunities for the local and regional economies.

Environmental/Natural Resources

A large portion of the study area lies within the river valleys of the Minnesota River and Blue Earth River. Several other sensitive water features and wetlands are scattered throughout the study area, which may influence the location and type of future infrastructure improvements. The alternatives development and evaluation processes for future projects will need to conduct an in-depth review and consideration of these features, along with assessing right of way needs and potential impacts to existing flood control structures, future flood risks, impacts to unique vegetation, prime farmlands, cultural/historic resources, soil and groundwater contamination, and threatened/endangered species.

Attachment D – Identification and Evaluation of Corridor Concepts

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

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AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Identification and Evaluation of Corridor Concepts

Date: November 29, 2021

To: Project Management Team

From: Angie Bersaw, AICP Deputy Project Manager, Bolton & Menk, Inc.

Ashley Hudson, AICP Transportation Planner, Bolton & Menk, Inc.

Subject: Final Concept Development and Evaluation Memo

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO) and Minnesota Department of Transportation (MnDOT)

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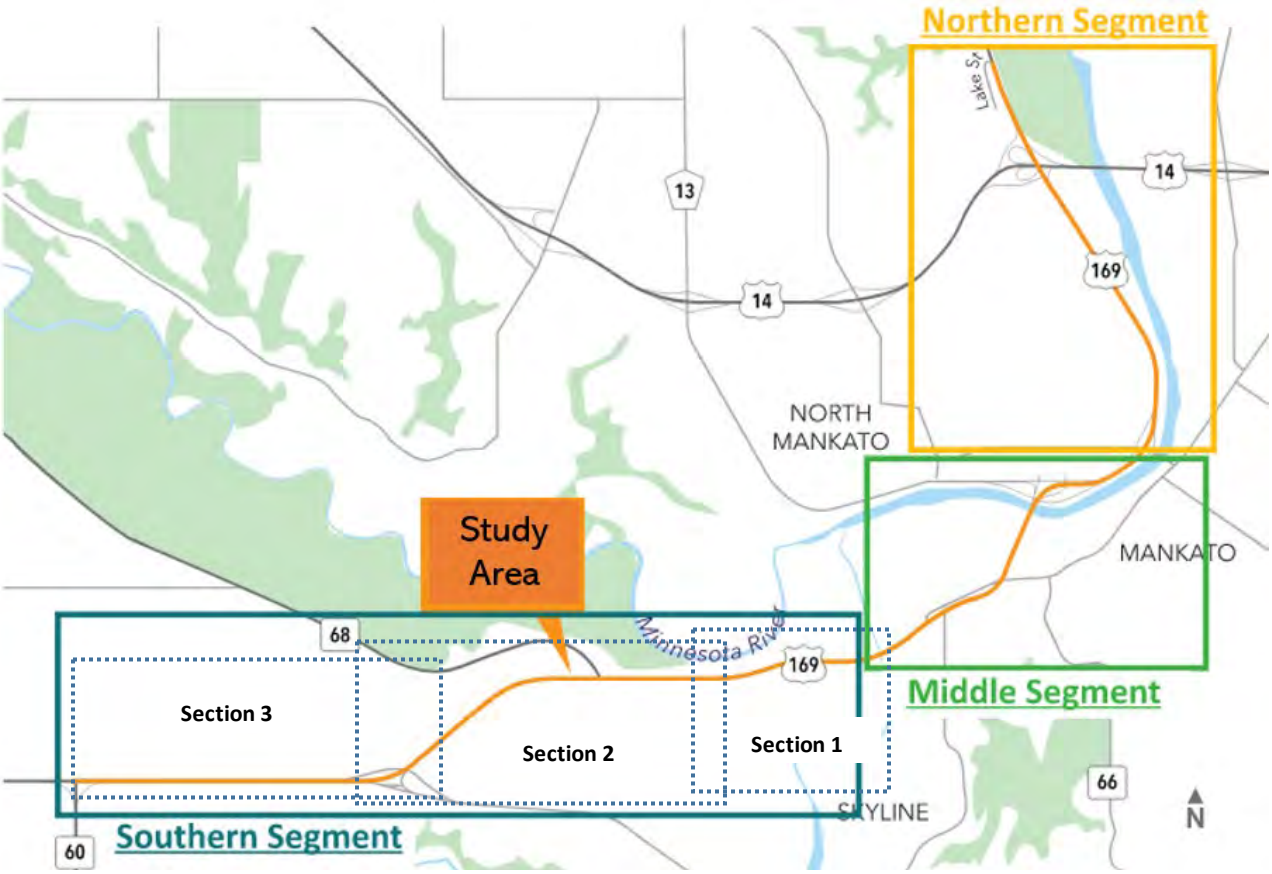
Appendices

I. Introduction

Representatives from the Mankato/North Mankato Area Planning Organization (MAPO) and the Cities of North Mankato, Mankato, Blue Earth County, Nicollet County, and the Minnesota Department of Transportation (MnDOT) made up a Project Management Team (PMT) that developed improvement concepts on Highway 169, and the surrounding local network. The study area extents included Lake Street at the north and Highway 60 at the south as shown in **Figure 1**. For ease in describing key corridor/network needs, the study area was split into three subareas based on the unique context within each. The northern, middle, and southern subareas and for the same reasons the southern subarea was split into three sections. The subareas are also shown in **Figure 1**.

Figure 1. Study Extents and Subareas



Multiple improvement concepts were identified and evaluated based on the existing conditions analysis, purpose and need, and issues and needs identified through public, agency and stakeholder involvement. The memo describes and documents concepts evaluated for each subarea of Highway 169.

II. Initial Concepts List

The list below represents all concepts considered for each subarea. A discussion of concepts can also be seen in the Concept Traffic Operations Memorandum in **Appendix B.**

Northern Subarea

A. Signalized Green T intersection at eastbound Highway 14 exit ramp
B. Combine River Lane/Lind Street and maintain Webster Avenue
    i. Signalized intersection at River Lane/Lind Street and Webster Avenue
    ii. Roundabout intersections at River Lane/Lind Street and Webster Avenue
    iii. Signalized Reduced Conflict U-Turns (RCUTs) at River Lane/Lind Street and Webster Avenue
C. Combined intersection – Lind Street, River Lane, Webster Avenue
D. Highway 169/Highway 14 Interchange
    i. Full cloverleaf
    ii. Eliminate south loop with a signalized intersection
    iii. Eliminate south loop with a roundabout intersection
    iv. Diverging Diamond
    v. Roundabout ramp intersections
E. Local connection improvements
    i. Range Street remain open with modifications to lane striping/utilization
    ii. Range Street Right-In/Right-Out (RIRO) Intersection
    iii. Range Street cul-de-sac
    iv. Monroe Avenue – check sight distance and determine need for intersection
F. Pedestrian considerations
    i. Future trail connection across Highway 169 and Minnesota River using the existing Highway 14 bridge and including connections to Rex Macbeth Trail and the Minnesota River Trail
    ii. Possible new grade separated crossing north of Lind Street
    iii. Possible new grade separated crossing at Webster Avenue

Middle Subarea

A. Veteran's Memorial Bridge/Belgrade Avenue/Highway 169 Interchange
    i. Westbound lane reduction and pedestrian crossing improvements
    ii. Roundabout at western interchange ramp terminal

B. Riverfront Drive/Highway 169 Interchange

    i. Right Turn Lane Concept - Add channelized westbound right turn lane at northbound Highway 169 entrance ramp, tighten right turn, pedestrian crossing improvements, close local accesses off Riverfront Drive
    ii. Signalized Corridor Concept - Triple left from southbound Highway 169, additional eastbound through lane under the bridge which becomes a right turn lane at Poplar Street, additional entrance ramp lane for northbound Highway 169
    iii. Riverfront Drive West of Highway 169 Concept - Loop ramp from southbound Highway 169 eliminating access off Hubbell Avenue onto Riverfront Drive, roadway extension of

2nd Street from Owatonna Street to Hubbell Avenue and 3rd Street between Sibley Street and Hubbell Avenue, additional entrance ramp for northbound Highway 169

Southern Subarea

A. Section 1: Blue Earth River bridge to CSAH 33 (Hemlock Road)
   i. Concept A – Maintain 3/4 access at Hawley Street, restrict access at Amos Owen Lane and CSAH 33 by removing side street left turns (convert to RCUTs), install U turns between CSAH 33/McCauley Street and Amos Owen Lane/Hawley Street to accommodate lefts, potentially eliminate CSAH 33 access with new access south of Highway 68 or realign with Hemlock Road.
   ii. Concept B – eastbound right-in only at Hawley Street, restrict access at Amos Owen Lane and CSAH33 by removing side street left turns (convert to RCUT), install U turns between CSAH 33/Amos Owen Lane and Amos Owen Lane/Hawley Street to accommodate lefts, potentially eliminate CSAH 33 access with new access south of Highway 68 or realign with Hemlock Road.
   iii. Concept C – Full access signalized Green-T intersection at Hawley Street, restrict access at Amos Owen Lane by removing side street left turns (convert to RCUT), use U turn between CSAH 33/Amos Owen Lane to accommodate lefts, restrict access at CSAH 33 to RIRO
   iv. Concept D – Full access signalized Green-T intersection at CSAH 33, restrict access at Amos Owen Lane by removing side street left turns (convert to RCUT), install U turn between CSAH 33/Amos Owen Lane to accommodate lefts, restrict access at Hawley Street to RIRO
   v. Grade separated pedestrian crossings
      - Overpass at Hawley Street
      - Underpass at Blue Earth River Bridge

B. Section 2: Highway 68 to CSAH 90
   i. Concept A - Maintain existing access locations, construct High-T at Highway 68, restrict direct access to Highway 169 for businesses, restrict left turns at County Road 120 and CSAH 69, install U turn between County Road 120 and CSAH 69 to accommodate westbound left turn from T-943, close Bison Street access
   ii. Concept B1 – Construct High-T at Highway 68, consolidate access near CSAH 69 to provide better access spacing, construct connector roads to direct local traffic to new access location, close County Road 120 and Bison Street accesses
   iii. Concept B2 - Consolidate access between County Road 120 and CSAH 69 to provide better access spacing, construct connector roads to direct local traffic to new access location, close Bison Street access, reduce access at Highway 68 to RIRO
   iv. Concept C - Use RCUTs for County Road 120 and CSAH 69, add south leg to Highway 68 intersection, close Bison Street access

C. Section 3: CSAH 90 to the Highway 169/60 intersection
   i. Concept A - Close access at 208th Lane and Loren Drive, restrict northbound left turn at Highway 60/Highway 169 intersection, install U turns between Loren Drive/County Road 117 and west of Highway 60/Highway 169 intersection to accommodate lefts, reduce access at Gadwall Road to RIRO

ii. Concept B - Realign access at Gadwall Road to provide better access spacing, close access at 208th Lane, Loren Drive and County Road 117, construct connector road to connect County Road 117 with the new Gadwall Road access location

III. Early Concepts Screening

Table 1 below describes reasons for early dismissal of concepts that showed fatal flaws in comparison against the study's goals and objectives and purpose and need. The early screening process was conducted and documented by the PMT and shared with the public. The concepts dismissed below were not carried forward into the detailed concept evaluation. See the **Appendix D** for sketches of the dismissed concepts.

Table 1. Dismissed Concepts

Dismissed Concepts	Reason Dismissed*
Northern Subarea	
Signalized Green T at the eastbound Highway 14 exit ramp	• Early layout of this concept showed the northbound left turn lane to westbound Highway 14 located too close to the Highway 169 and eastbound Highway 14 exit ramp intersection. Specifically, the crossover between the eastbound left traffic from the eastbound Highway 14 exit ramp and the northbound left traffic at the westbound Highway 14 entrance ramp is a crash concern
Combined intersection – Lind Street, River Lane, Webster Avenue	• Concept is too impactful to existing businesses and future redevelopment areas and would require significant local road network reconfiguration
Southern Subarea	
Section 1 – Concept A: Maintain existing access, convert to RCUTs, modify geometry at Hawley Street to improve safety	• Operational issues – Westbound left turns at Hawley Street and at CSAH 33 operate with failing LOS
Section 1 – Concept B: Restrict access at Hawley Street, RCUTs at CSAH 33 and Amos Owen Lane	• Operational issues – Westbound left turns at CSAH 33 and westbound U-Turns at RCUTs operate with failing LOS

**The supporting traffic and safety analyses are documented in the Concept Traffic Operations Memo in Appendix B.*

IV. Detailed Evaluation of Concepts

Following the early screening process, concepts carried forward were run through an evaluation matrix. Each subarea evaluation matrix scored concepts on their ability to achieve study goals and concept scores were compared to the no-build and each other to determine which perform best. The northern and southern subarea evaluation matrices are included in **Appendix A**. Local system improvements and grade separated pedestrian crossing were also evaluated in the northern subarea. In addition, the southern subarea evaluated grade separated pedestrian crossings. Matrices for these can also be found on the following pages.

Study Goals and Objectives

Table 2 shows the study goals and objectives used for the detailed evaluation of concepts. Not all objectives were relevant to each subarea or evaluation of local system improvements. Refer to each subarea matrix in **Appendix A** for the objectives relevant to each subarea and concept.

Table 2. Study Goals and Objectives

Study Goals	Goal Objectives
Goal A: Preserve community connections and economic vitality.	• Maintain sustainable access for local trips into/out of Mankato and North Mankato • Maintain emergency access routes into/out of Mankato and North Mankato • Accommodate reasonable vehicle/truck access • Accommodate reasonable pedestrian/bicycle access • Enhance community identity
Goal B: Provide efficient and reliable mobility for all users.	• Provide acceptable system reliability serving existing and planned growth • Provide acceptable regional highway travel times while accommodating reliable local access • Provide acceptable side street delay • Improves side street delay over existing conditions • Understand and plan for freight needs • Meet access spacing guidelines • Improve access spacing guidelines over existing conditions • Provide a connected transportation system that accommodates trips consistent with roadway functional classification • Perceived pedestrian/bicyclist level of comfort • Accommodate future transit plans and needs • Understand and plan for roadway expansion

Goal C: Safely accommodate all system users.	• Reduce crash and severity rates • Provide safe pedestrian and bicycle travel near and across roadways, to area schools, and to regional destinations.
Goal D: Provide infrastructure improvements that respect the environment.	• Avoid, minimize, and mitigate impacts to sensitive environmental resources • Avoid, minimize, and mitigate impacts to hazardous contaminated areas • Disproportionate impact to Environmental Justice (EJ) populations
Goal E: Develop a financially responsible implementation plan.	• Right-size improvements to address needs yet maximize use of existing infrastructure where possible • Develop fiscally responsible improvements (construction costs) • Develop fiscally responsible improvements (right-of-way and environmental impact costs) • Develop project phases that meet schedule and funding constraints and maximize opportunities • Develop a supported funding model to clearly identify agency responsibilities • Position partner agencies to seek federal and state grants for identified improvements to minimize partner costs
Goal F: Develop a plan supported by all agency partners.	• Supported by the Project Management Team (PMT)

Additional Concepts Dismissed

After further traffic analysis, it was determined that the concepts below have concerning operational issues and the PMT decided to dismiss each. **Table 3** provides reasoning for concepts dismissed early.

Table 3. Additional Concepts Dismissed

Dismissed Concepts	Reason Dismissed*
Northern Subarea	
Highway 169/Highway 14 Interchange - Eliminate north loop with a roundabout intersection	• Operational issues - Maximum queues along exit ramp are anticipated to extend onto mainline Highway 14 and delay for the exit ramp movements operates with failing LOS
Highway 169/Highway 14 Interchange - Eliminate south loop with a roundabout intersection	• Operational issues - Maximum queues along exit ramp are anticipated to extend onto mainline Highway 14 and delay for the exit ramp movements operates with failing LOS

**The supporting traffic and safety analyses are documented in the Concept Traffic Operations Memo in Appendix B.*

The Middle Subarea

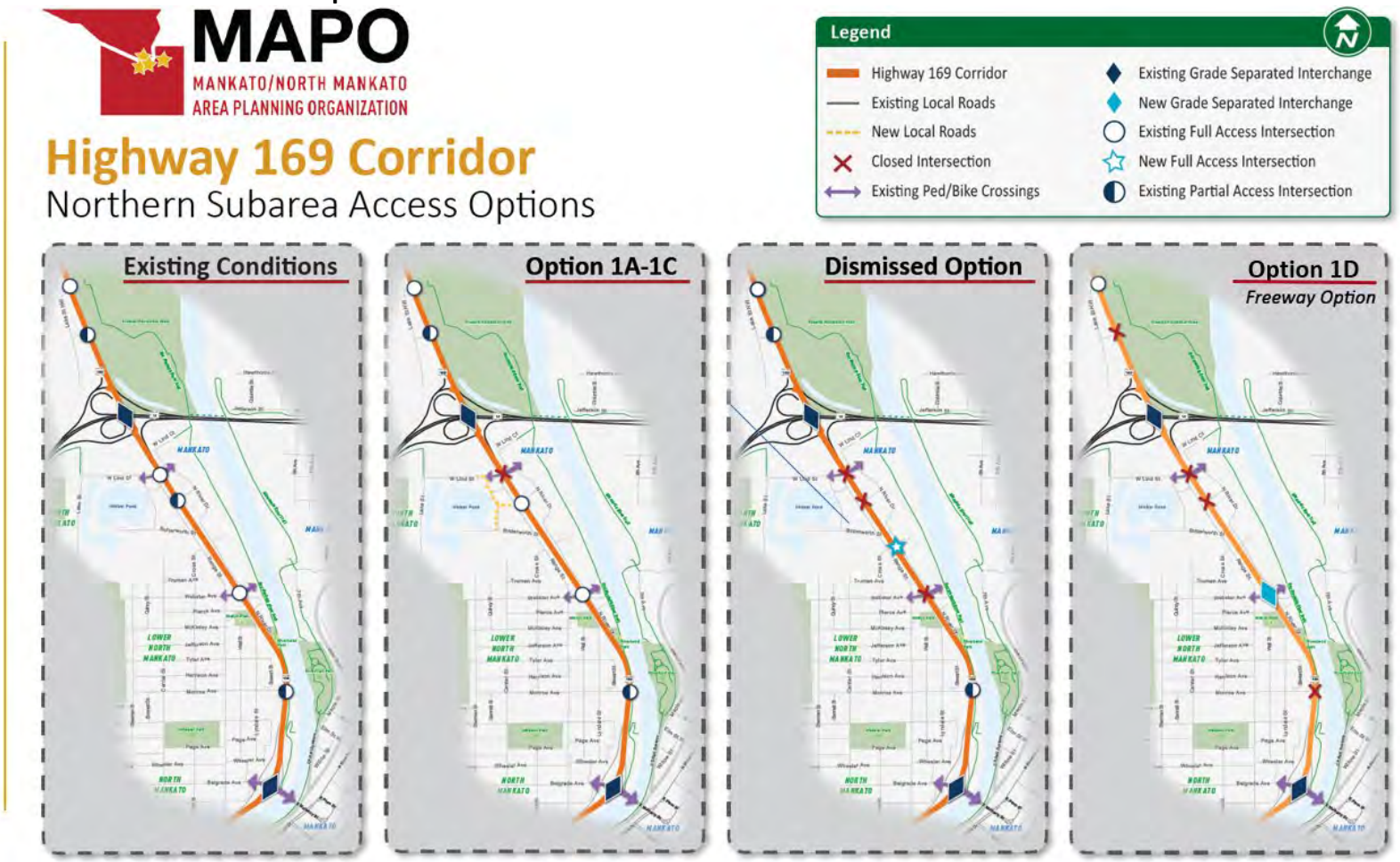
Concepts considered for the middle subarea included newly developed lower cost concepts and concepts identified in the previous Riverfront Drive and Belgrade Avenue Corridor Studies. In the early stage of the detailed concept evaluation, MnDOT announced the middle subarea would be best addressed through the scoping process of an upcoming Veterans Memorial Bridge project. MnDOT and the cities of Mankato and North Mankato will utilize the concepts developed for this subarea and engage in further analysis and public input to determine a preferred alternative for the upcoming project. For this reason, the middle subarea concepts were not carried through the detailed evaluation process. However, the PMT requested that concepts be documented for consideration in the upcoming MnDOT project scoping effort. See documented concepts in **Appendix C**.

V. Northern Subarea Evaluation

The following pages include images, descriptions, and summaries of scores for each concept. This also depicts how concepts were presented to the public. Full copies of the concept drawings can be seen on the MAPO website (www.mnmapo.org)

Figure 2 below provides a high-level overview for each Northern Subarea concept. Concepts 1A-1C all close Lind Street and relocate a full access intersection to North River Lane with either traffic signals, reduced conflict U-turns (RCUTS), or roundabouts. As discussed in Section III, Early Concept Screening, the study team looked at combining Lind Street, North River Lane, and Webster Avenue into one intersection but dismissed the idea because it was too impactful to businesses and properties to fit in the local road reconfigurations needed to support it. Concept 1D converts this section of Highway 169 into a freeway by completing the cloverleaf at the Highway 169/14 interchange and adding a grade separated interchange at Webster Avenue. Not shown in this graphic, but the study team also looked at other Highway 169/14 interchange improvements such as a ramp signal and a Diverging Diamond interchange. These other Highway 169/14 interchange improvements are shown on the follow pages and can be paired with a 1A-C concept.

Figure 2. Northern Subarea Access Concepts



Northern Subarea Concepts

No-Build Concept

With every transportation improvement study, a "no-build" concept is evaluated to justify the need for any improvement investments. The “no-build” or existing conditions concept is shown in **Figure 3**. This evaluation looks at what will happen over the next 20 years if no transportation improvements are made but the communities and region continue to grow as planned.

The “no-build” concept was evaluated against the study goals and given an overall score. The no-build scored very poorly with a negative score (-63 out of a possible 291 points) due to the many project goals it did not address. This justified to the study team that "doing nothing" is not a viable concept. The following is a high-level summary as to why. See the Traffic Operations Memo in **Appendix B** for more details.

- 2040 traffic projections show excessive delays at the eastbound Highway 14 ramp during peak traffic hours.
- Five of seven intersections are spaced closer than MnDOT access spacing guidelines recommend
- There were a high number of crashes, 159 total with two severe, between 2015 and 2019. With anticipated traffic growth this would worsen.
- Crashes at the Lind Street intersection are more than three times the normal range for similar intersections.
- Local business access is very important in this subarea and council resolutions reinforce this.
- There is a demand for pedestrian and bicycle access across Highway 169 to connect the existing trail systems at Lind Street and Webster Avenue.

Figure 3. Northern Subarea No-Build Concept

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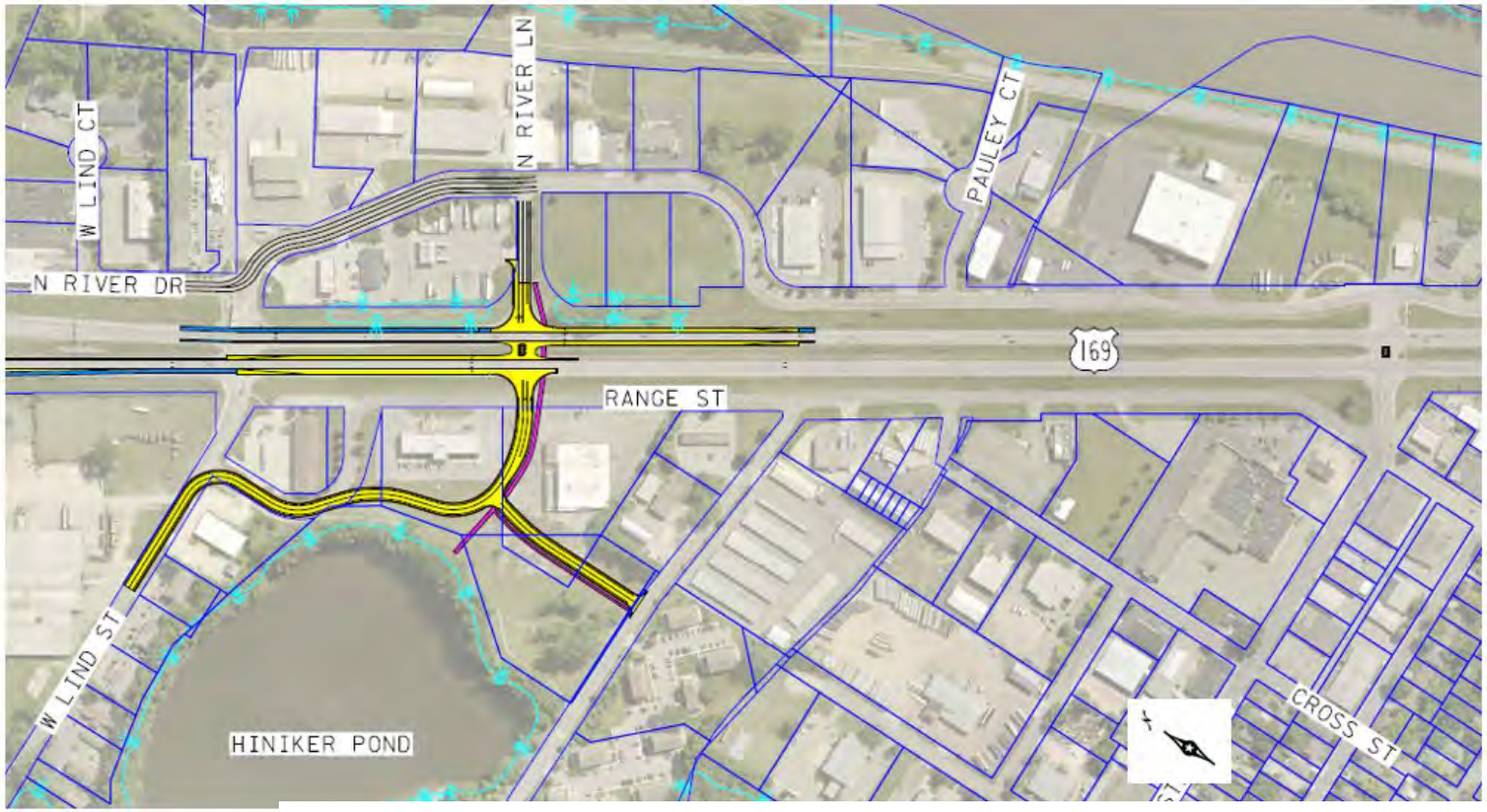
Northern Subarea Concepts

Concept 1A – Combine River Lane/Lind Street and Maintain Webster Avenue (Signals)



Summary of Evaluation:

Goal A: All movements are maintained at intersections accommodating reasonable access.

Goal B: Close access spacing to Highway 14 ramps. Average side street delay is increased from the no build scenario.

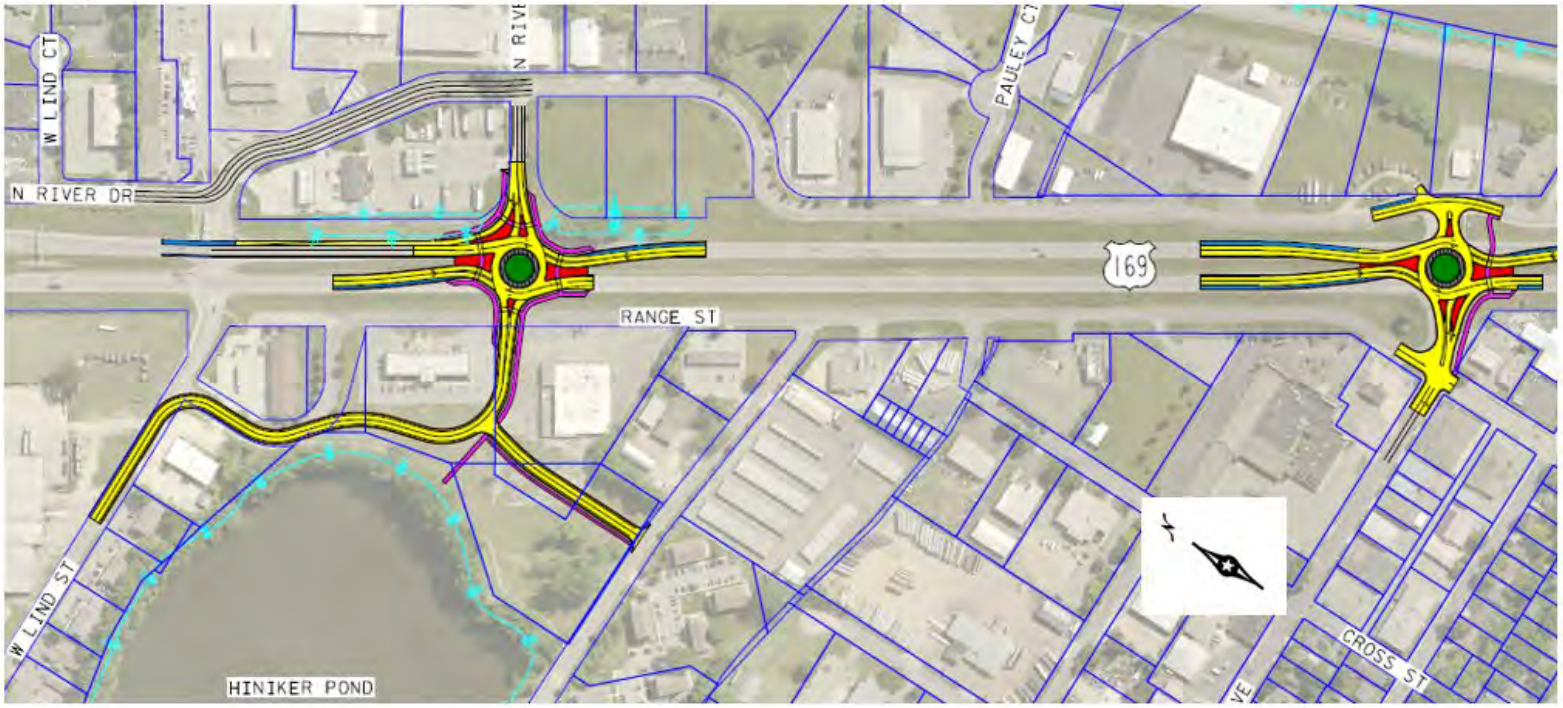
Goal C: Retaining traffic signal would not reduce crash/severity rates.

Goal D: New road alignment north of Hiniker Pond and Highway 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project. Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond.

Goal E: A fair fiscally responsible score is applied here because the concept's lack of addressing safety issues makes it less competitive for funding programs. Also, the cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 1B – Combine River Lane/Lind Street and Maintain Webster Avenue (Roundabouts)



CONCEPT EVALUATION

GOOD ++ | FAIR + | POOR -

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	+
Safety for all users	++
Community & environmental impacts	+
Fiscally responsible $7.3M	++
Agency support	++

SCORE 202.5

Summary of Evaluation:

Goal A: All movements are maintained at intersections accommodating reasonable access. Median areas provide opportunity for aesthetics/monumentation.

Goal B: Close access spacing to Highway 14 ramps. Average side street delay is reduced from the no build scenario.

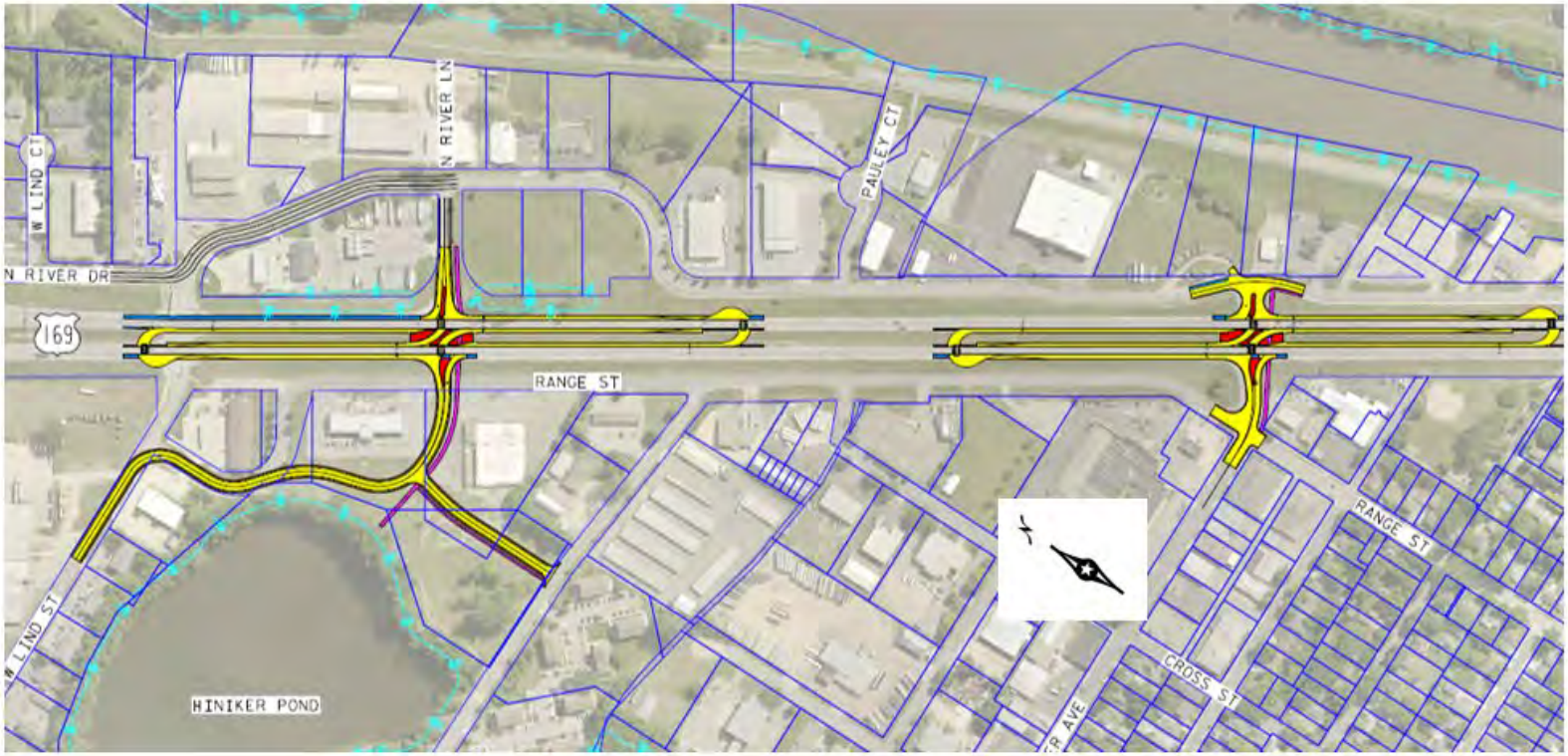
Goal C: Roundabouts reduce crash severity rates and pedestrian/vehicle conflict points.

Goal D: New road alignment north of Hiniker Pond and Highway 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project. Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond. Intersection improvements at both River Lane and Webster Avenue have larger disturbance footprint in this area.

Goal E: A good fiscally responsible score is applied here because the concept's ability to address safety issues makes it more competitive for funding programs. Also, the cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 1C – Combine River Lane/Lind Street and Maintain Webster Avenue (RCUTs)



CONCEPT EVALUATION

GOOD FAIR POOR

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	+
Safety for all users	+
Community & environmental impacts	+
Fiscally responsible $8.6M	+
Agency support	+

SCORE 115

Summary of Evaluation:

Goal A: Sightline concerns with plantings in RCUT medians. Side street movements are restricted so reasonable access is not perceived as being accommodated.

Goal B: Close access spacing to Highway 14 ramps. Average side street delay is the same as the no build scenario.

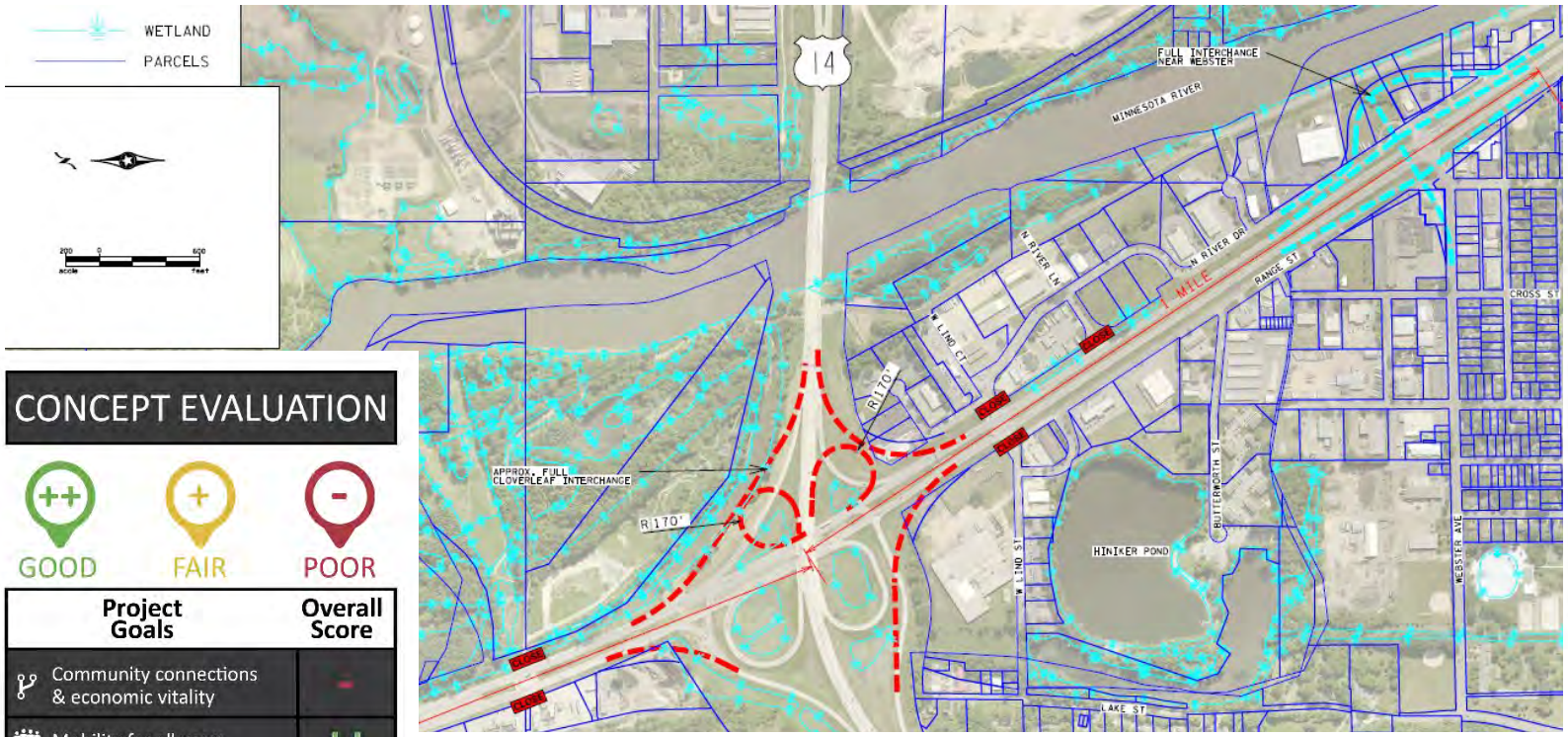
Goal C: RCUTs have been shown to reduce crash/severity rates. RCUTs are perceived as confusing for pedestrians and bicyclists.

Goal D: New road alignment north of Hiniker Pond and Highway 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project. Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond. Intersection improvements at both River Lane and Webster Avenue have larger disturbance footprint in this area.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 1D – Webster Ave Interchange and 2A – Highway 14/169 Interchange (Full Cloverleaf)



CONCEPT EVALUATION

GOOD ++ | FAIR + | POOR -

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	-
Fiscally responsible - $25M	-
Agency support	-

SCORE 156

CONCEPT EVALUATION

GOOD ++ | FAIR + | POOR -

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	++
Safety for all users	-
Community & environmental impacts	-
Fiscally responsible - $13M	-
Agency support	+

SCORE 31.5

Summary of Evaluation:

Goal A: Freeway will result in increased travel time from Highway 14 to area around McDonalds and Lind Street. Large cloverleaf footprint provides limited opportunities for aesthetic improvements.

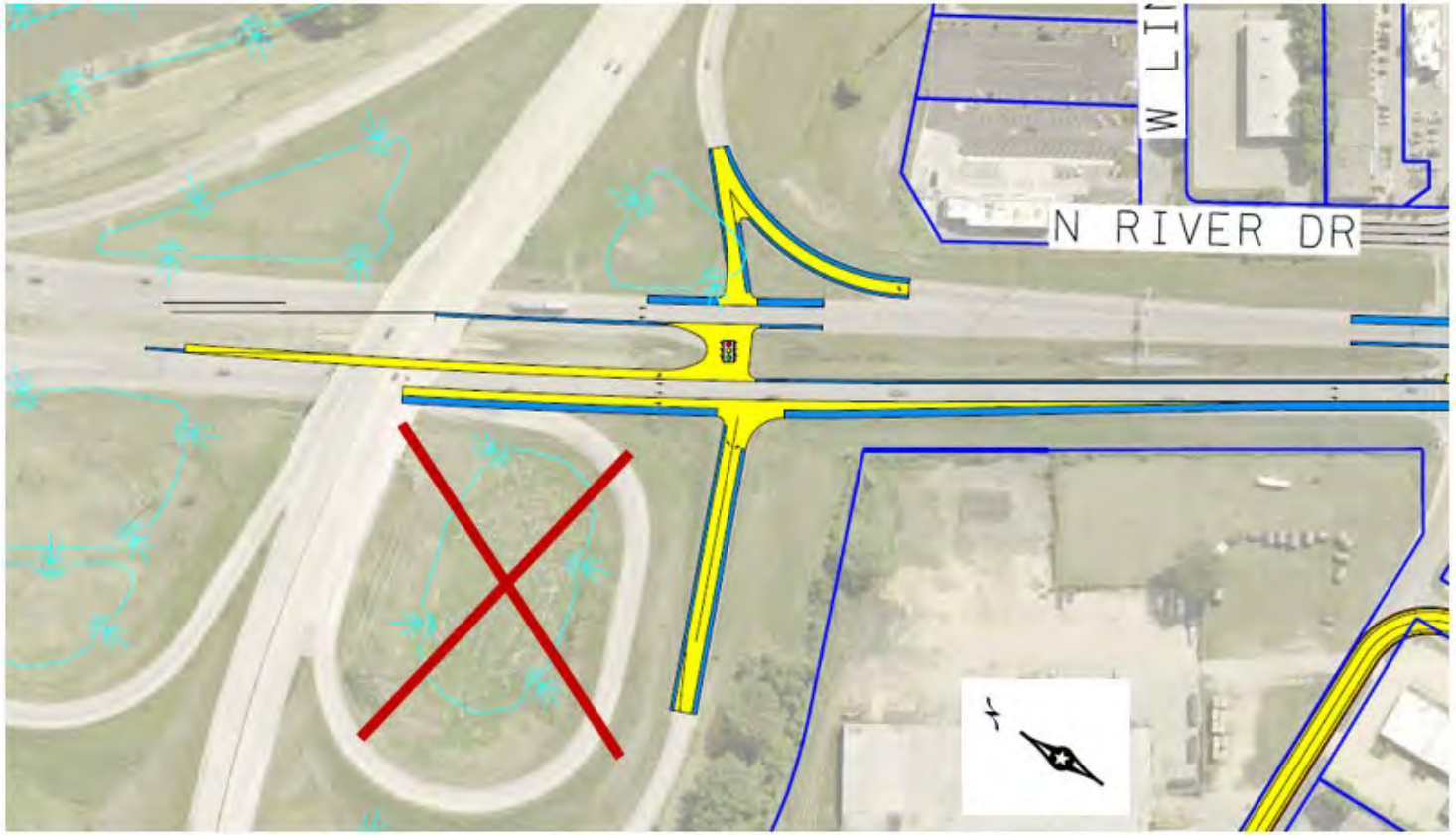
Goal C: Full cloverleaf introduces new weave areas.

Goal D: Highway 14 West to Highway 169 ramp would impact the existing wetland in the northeast quadrant. - Highway 169 North to Highway 14 East ramp would impact McDonald's building. - The full interchange configuration Concept 2A would warrant modifications to the Minnesota River levee that protects the City of Mankato and North Mankato from flood waters produced by the Minnesota River. Further coordination with FEMA will be required to understand the requirements associated with levee modifications or relocations associated with Concept 2A. - Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond. An interchange at Webster Avenue would have a larger disturbance footprint in this area. North Mankato Resolution No. No. R-19-0708-119 states at-grade access must be preserved at Webster Avenue. For this reason, this option would fail goal F, as it would not be supported by the PMT.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Northern Subarea Concepts

Concept 2C – Highway 14/169 Interchange (Eliminate South Loop - Signal)



CONCEPT EVALUATION		
GOOD (++)	FAIR (+)	POOR (-)

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	+
Community & environmental impacts	++
Fiscally responsible - $2.5M	++
Agency support	++

SCORE 183

Summary of Evaluation:

Goal B: Average side street delay is significantly reduced from the no build scenario.

Goal C: Increase in total number of crashes anticipated with adding traffic signal.

Goal D: Alone poses low risk and further evaluation needed relative to what it is paired with for improvements to the south.

Goal A and E showed minimal to no differentiating impact.

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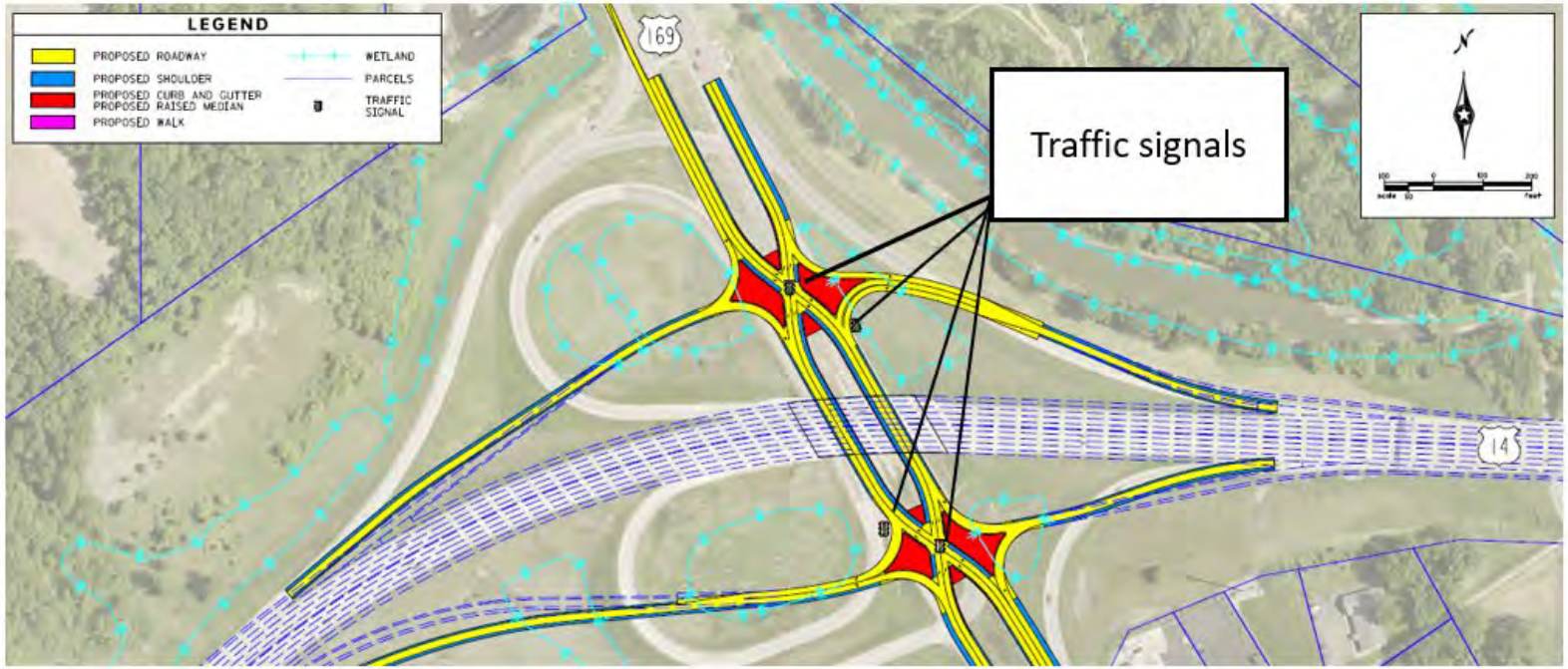
Northern Subarea Concepts

Concept 2D – Highway 14/169 Interchange (Diverging Diamond)



CONCEPT EVALUATION

	GOOD (++)	FAIR (+)	POOR (-)
Project Goals			Overall Score
Community connections & economic vitality			++
Mobility for all users			++
Safety for all users			+
Community & environmental impacts			++
Fiscally responsible - $9M			++
Agency support			++

SCORE 193.5

Summary of Evaluation:

Goal A: Median areas provide opportunity for aesthetics/monumentation, but sightline concerns may limit this.

Goal B: Average side street delay is significantly reduced from the no build scenario.

Goal C: Increase in total number of crashes anticipated with adding traffic signals.

Goal D: Highway 14 West to Highway 169 ramp would impact the existing wetland and flood levee. Further coordination with FEMA will be required to understand the requirements associated with levee modifications or relocations.

Goal E showed minimal to no differentiating impact.

Northern Subarea Local System Improvements

Concept L1 – Range Street Remains Open (No Change)

This concept would leave Range Street as it is today. The score is similar to Concept L4 on page 20. The main evaluation points include:

- Goal A: Maintains access for local trips and emergency routes (relative to Highway 169 improvement paired with).
- Goal C: Existing crash issues will continue (relative to Highway 169 improvement paired with).

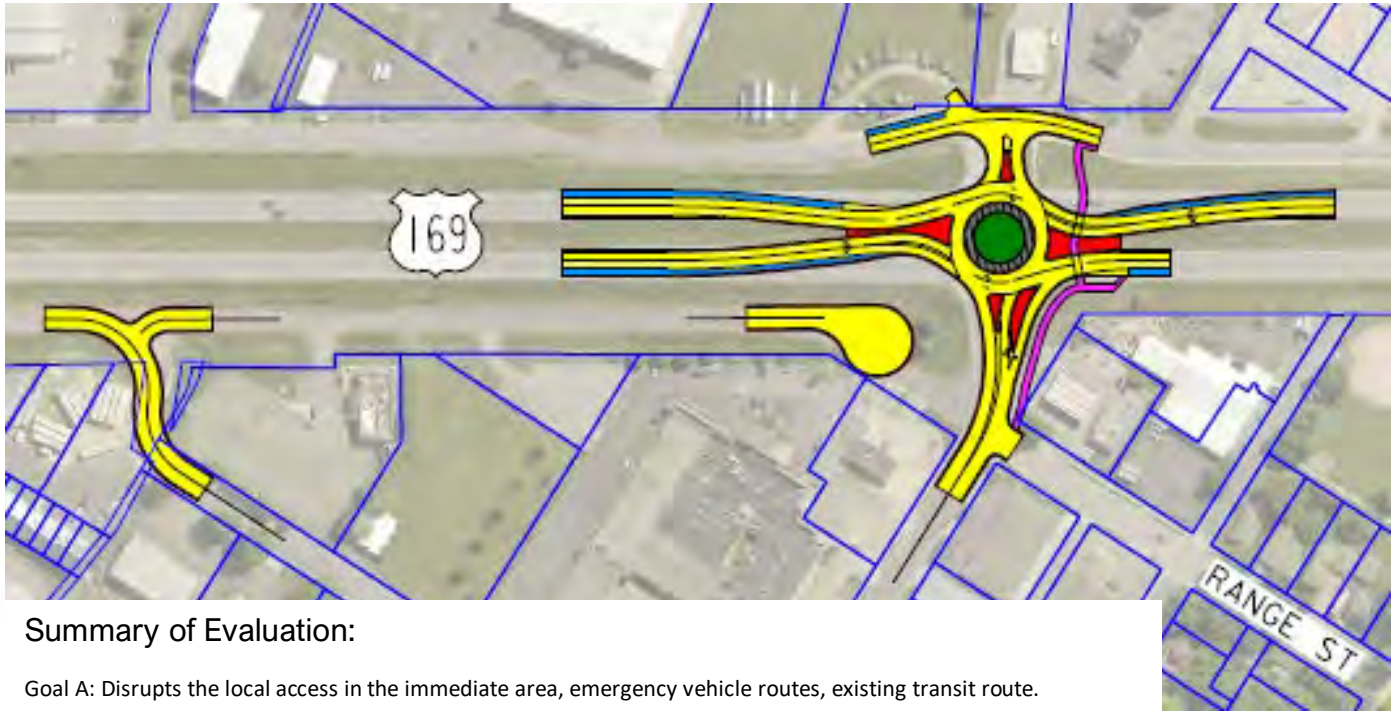
Northern Subarea Local System Improvements

Concept L2 – Range Street Cul-de-sac

CONCEPT EVALUATION

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	-
Safety for all users	++
Community & environmental impacts	++
Agency support	-

SCORE -24



Summary of Evaluation:

Goal A: Disrupts the local access in the immediate area, emergency vehicle routes, existing transit route.

Goal C: Crash reduction anticipated with reduced access.

Goal B, D, and E showed minimal to no differentiating impact.

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Northern Subarea Local System Improvements

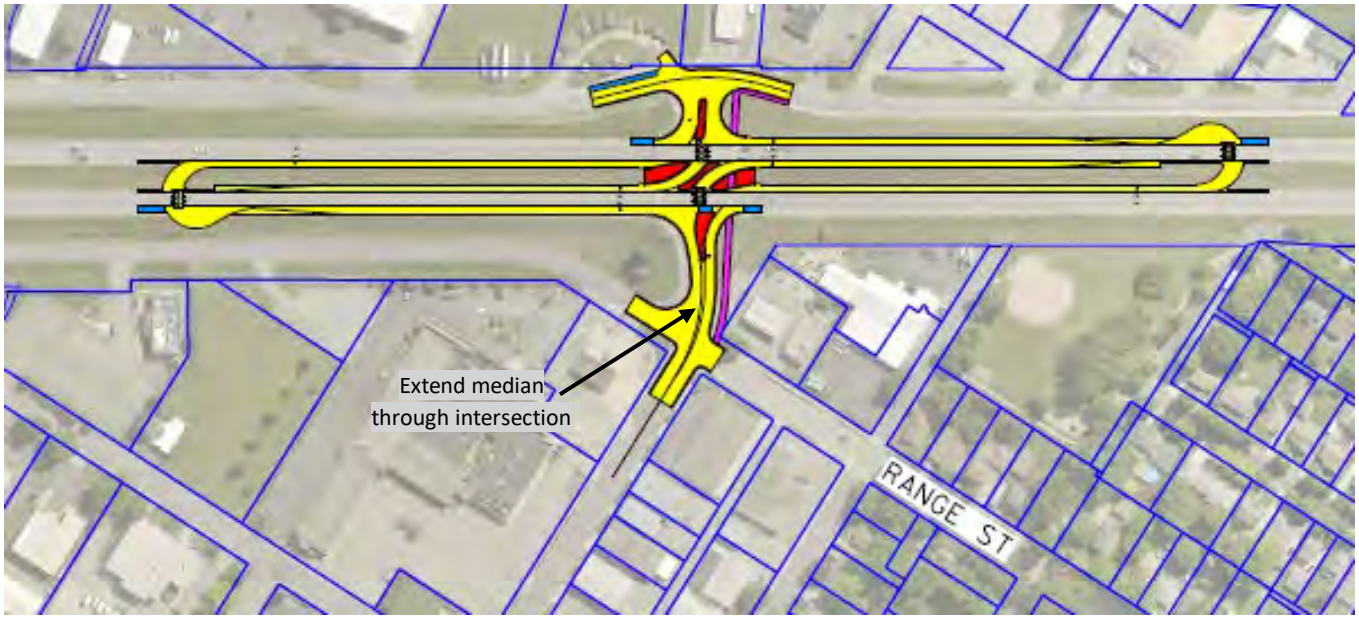
Concept L3 – Range Street Right-In/Right-Out

CONCEPT EVALUATION

	GOOD	FAIR	POOR
	++	+	-

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	+
Safety for all users	-
Community & environmental impacts	++
Agency support	++

SCORE 24



Summary of Evaluation:

Goal A: Limits local access in the immediate area and emergency vehicle routes.

Goal C: Crash reduction anticipated with reduced access.

Goal B, D, and E showed minimal to no differentiating impact.

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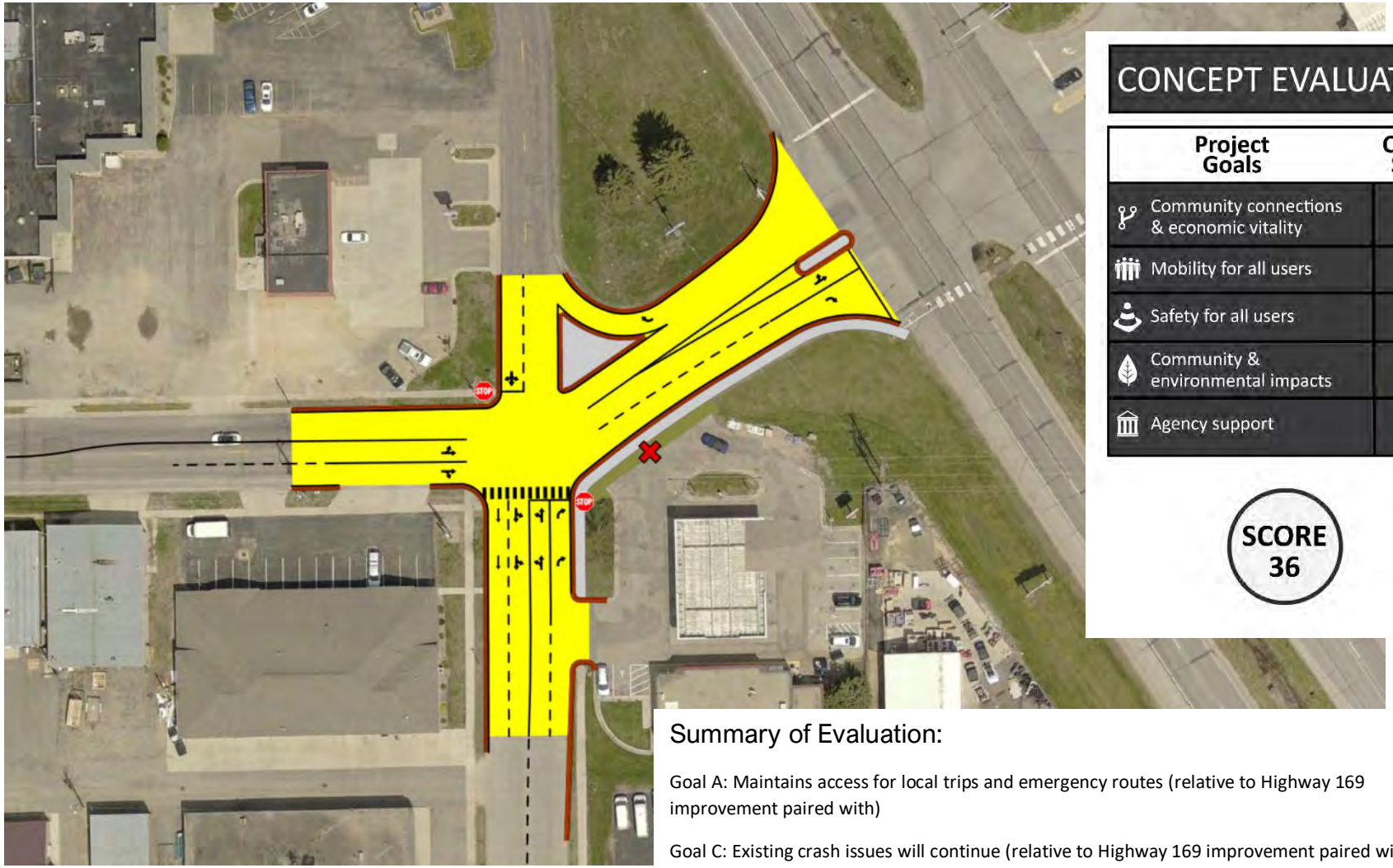
Northern Subarea Local System Improvements

Concept L4 – Range Street Modernization



Summary of Evaluation:

Goal A: Maintains access for local trips and emergency routes (relative to Highway 169 improvement paired with)

Goal C: Existing crash issues will continue (relative to Highway 169 improvement paired with)

Goal B, D, and E showed minimal to no differentiating impact.

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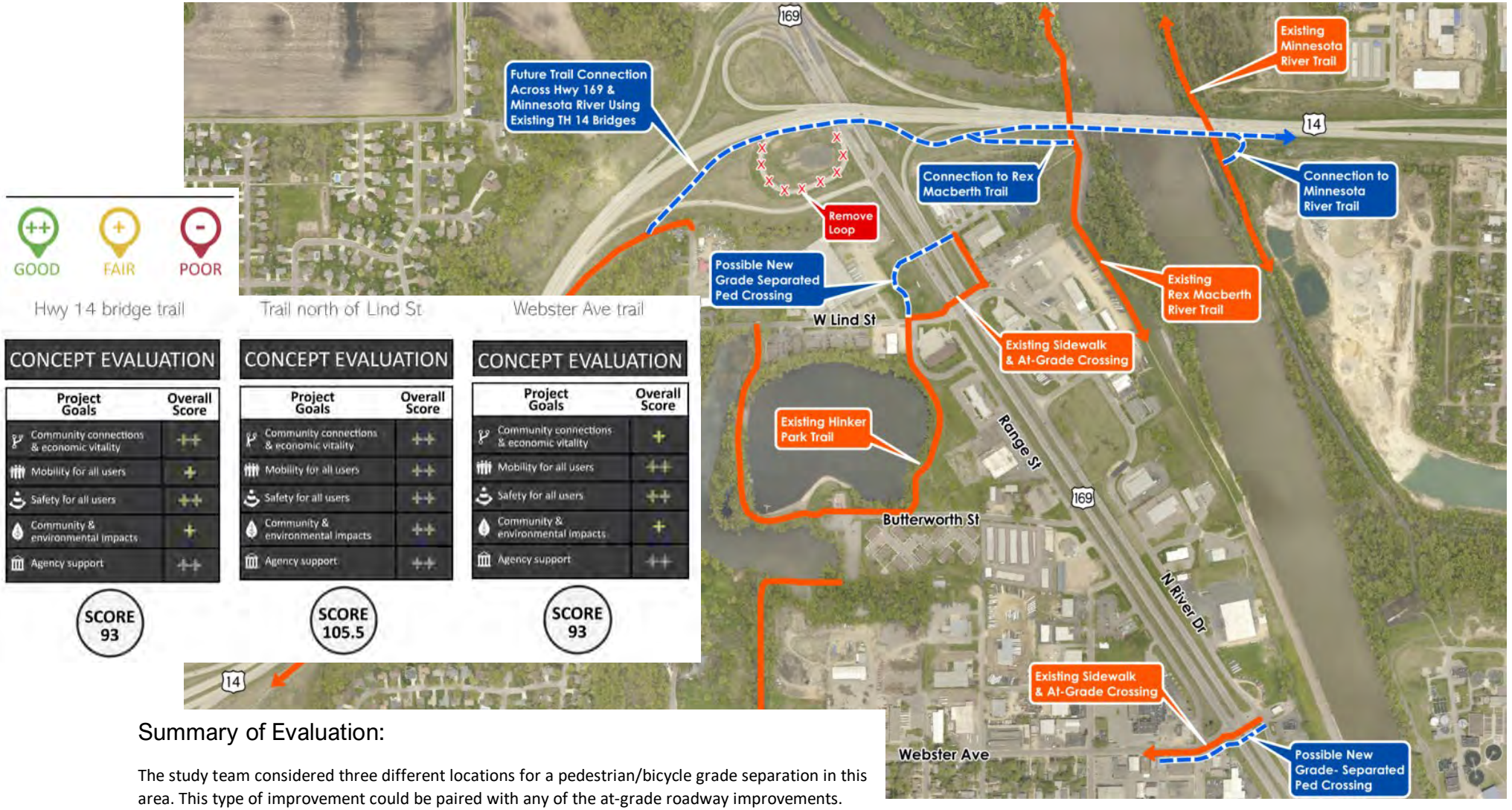
Northern Subarea Grade Separated Crossings



Summary of Evaluation:

The study team considered three different locations for a pedestrian/bicycle grade separation in this area. This type of improvement could be paired with any of the at-grade roadway improvements. We considered a grade separation at Webster Avenue, Lind Street, and adjacent to Highway 14.

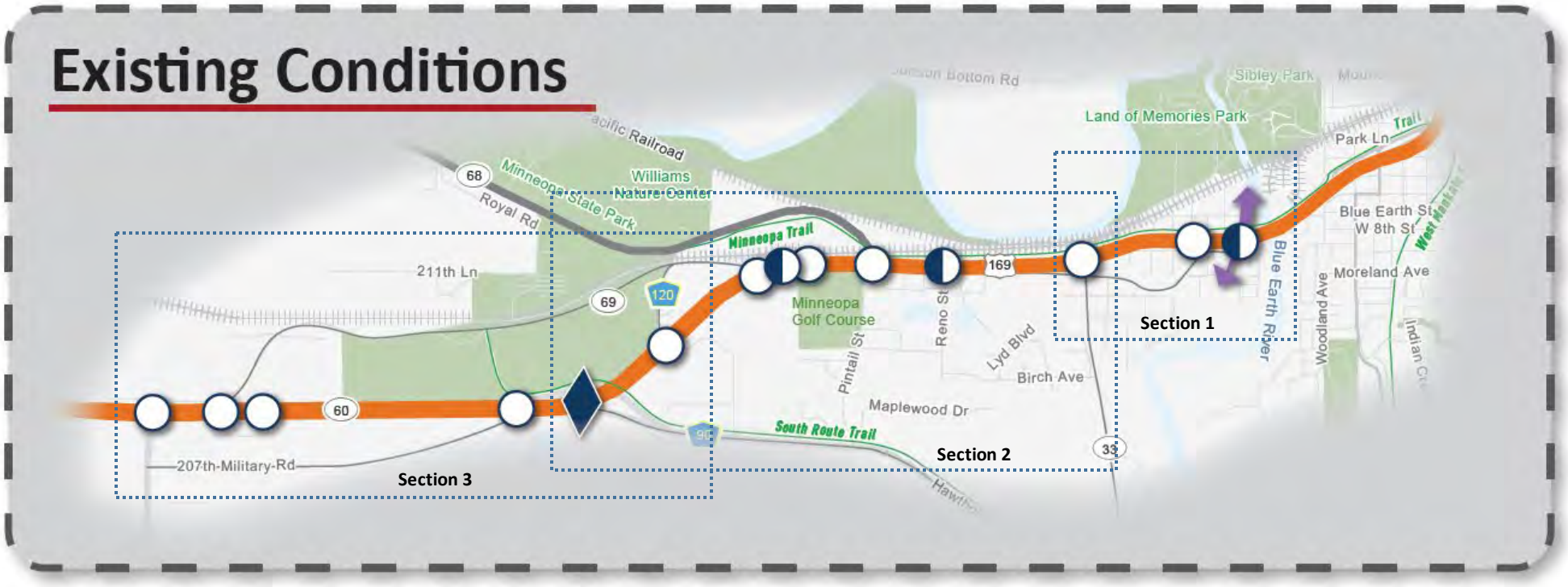
Both the Highway 14 bridge and Lind Street concepts scored the highest as they seemed to make the most natural connection between the Bluff Valley Trail and Rex MacBeth Trail for recreational users. These concepts also serve the pedestrian demand for access to convenience stores located east of Highway 169 and residential land uses west of Highway 169 near Lind Street.

VI. Southern Subarea Evaluated Concepts

The following pages include images, description, and summary of scores for each concept. This also depicts how concepts were presented to the public. Full copies of the concept drawings can be seen on the MAPO website (www.mnmapo.org)

As shown in **Figure 4**, for ease in describing key corridor/network needs the subarea area was split into three sections based on the unique context within each. The study team looked at several lower cost/high benefit solutions to address the existing and anticipated future needs based on current area planning documents. The study team also explored and evaluated future scenarios that are opportunity driven if unplanned growth in the area occurs.

Figure 4. Southern Subarea Existing Conditions and Sections



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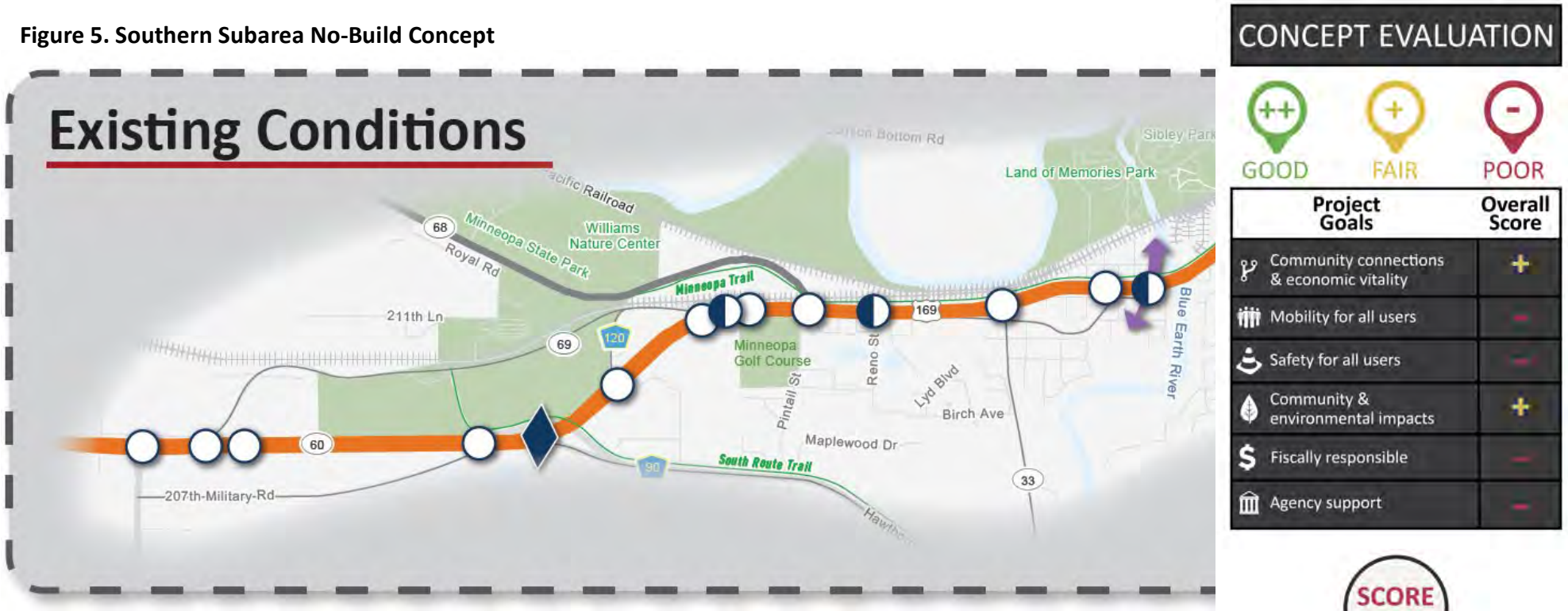
Southern Subarea Concepts

No-Build Concept

A southern subarea “no-build” concept was also evaluated against the study goals and given an overall score. The no-build concept is shown in **Figure 5**. The no-build scored very poorly with a negative score (-93 out of a possible 252 points) due to the many project goals it did not address. This justified to the study team that "doing nothing" is not a viable concept. The following is a high-level summary as to why. See the Traffic Operations Memo in **Appendix B** for more details.

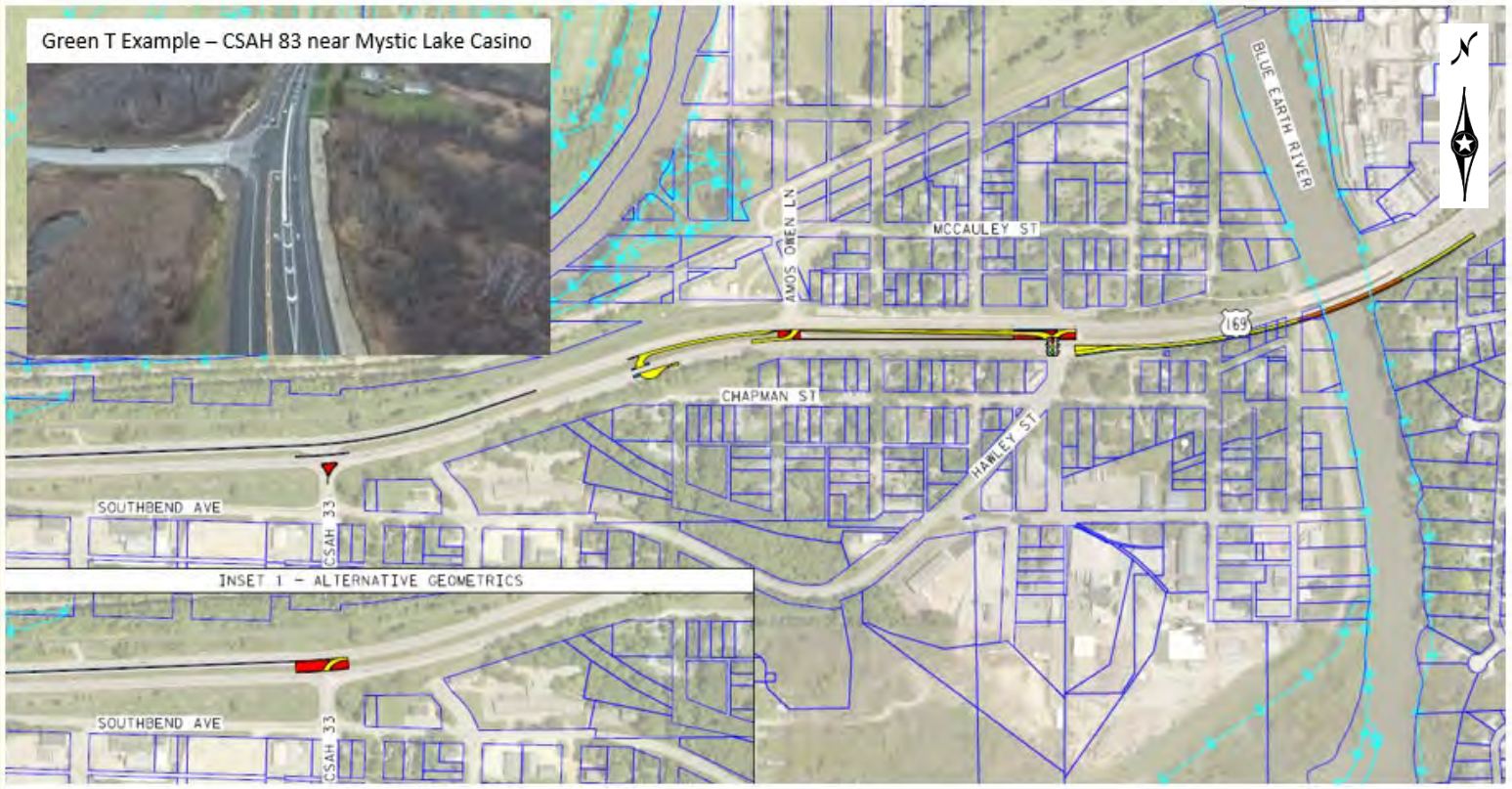
- 2040 traffic projections show back-ups particularly bad at WB left turn lane at Hwy 60, CSAH 69 (Hawley Street) and excessive delay at Highway 60 and CSAH 33 during the evening peak hours.
- Five of seven intersections are spaced closer than MnDOT access spacing guidelines allow
- There were a high number of crashes, 171 total with seven severe, between 2015 and 2019. Fatal crashes have occurred at CSAH 90, CSAH 69, Highway 68, and CSAH 69 (Hawley Street).
- There is a demand for pedestrian and bicycle access across Highway 169, at Hawley Street, to connect existing neighborhoods to a local convenience store.

Figure 5. Southern Subarea No-Build Concept



Southern Subarea Concepts

Section 1: Concept 1C



CONCEPT EVALUATION

	GOOD (++)	FAIR (+)	POOR (-)
Project Goals*			Overall Score
Community connections & economic vitality*			+
Mobility for all users*			++
Safety for all users			+
Community & environmental impacts			++
Fiscally responsible - $5.1M			++
Agency support			++

*With Pedestrian Bridge

SCORE 67.5

Summary of Evaluation:

Goal A: Limits CSAH 33 and Amos Owen Lane neighborhood access.

Goal B: Acceptable operations with all WBLs (Hawley Street and CSAH 33) at signalized Green T (Hawley Street). Does not address access spacing.

Goal C: Requires pedestrians to cross multiple lanes of traffic. Green-T would reduce severe crashes but increase rear end crashes with signal added along Highway 169.

Goal D: Low risk impact due to ability to construct improvements in existing right-of-way footprint.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Southern Subarea Concepts

Section 1: Concept 1D

CONCEPT EVALUATION

	GOOD (++)	FAIR (+)	POOR (-)
Project Goals*			Overall Score
Community connections & economic vitality*	++		
Mobility for all users*	++		
Safety for all users		+	
Community & environmental impacts	++		
Fiscally responsible - $4.7M	++		
Agency support	++		

*With Pedestrian Bridge

SCORE 61.5

Summary of Evaluation:

Goal A: Limits Hawley Street and Amos Owen Lane neighborhood access.

Goal B: Acceptable operations with all WBLs (Hawley Street and CSAH 33) at signalized Green T (CSAH 33). Does not address access spacing.

Goal C: Requires pedestrians to cross multiple lanes of traffic. Green-T would reduce severe crashes but increase rear end crashes with signal added along Highway 169.

Goal D: Low risk impact due to ability to construct improvements in existing right-of-way footprint.

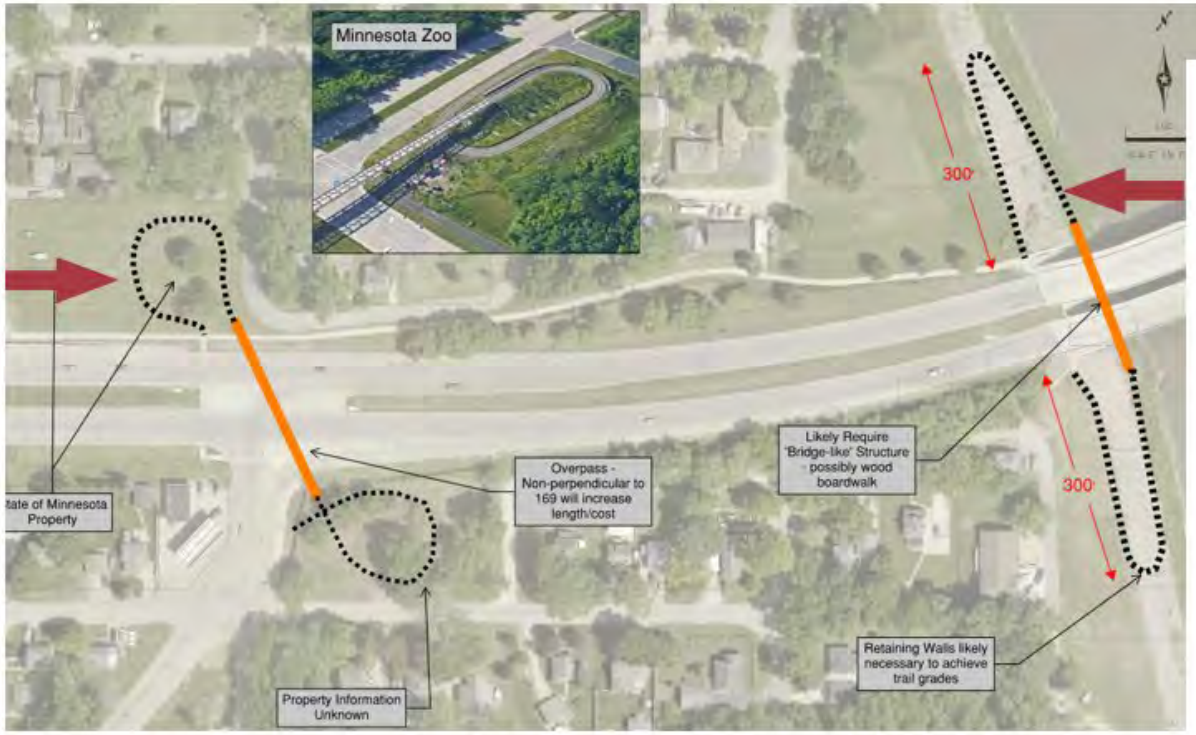
Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

CONCEPT EVALUATION

GOOD ++ FAIR + POOR -

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	++
Agency support	++

SCORE 102



CONCEPT EVALUATION

Project Goals	Overall Score
Community connections & economic vitality	-
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	++
Agency support	+

SCORE 78

Summary of Evaluation:

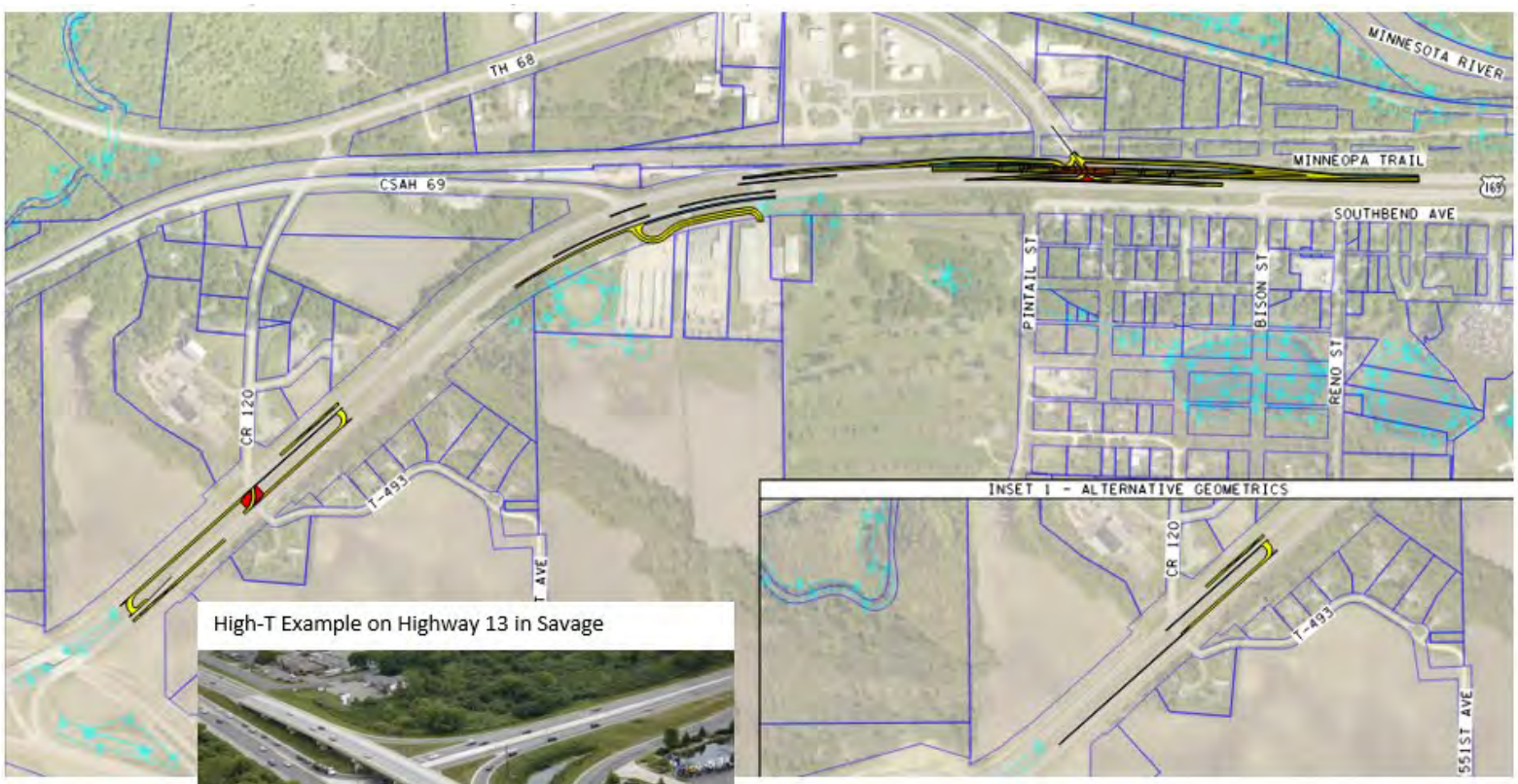
Goal A: The concept near Hawley Street would best serve existing demand for people to walk and bike across Highway 169 to and from the Quick Mart at the southwest quadrant of the intersection.

Goal D: The Hawley Street option would go over 169. This shows the footprint needed for the bridge and ramps that are accessible for all abilities. This is utilizing state owned land on the north and undeveloped section on the south.

Goal B, C and E showed minimal to no differentiating impact.

Southern Subarea Concepts

Section 2: Concept 2A



High-T Example on Highway 13 in Savage

CONCEPT EVALUATION

GOOD ++ FAIR + POOR -

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	++
Fiscally responsible- 22.2M	+
Agency support	++

SCORE 154.5

Summary of Evaluation:

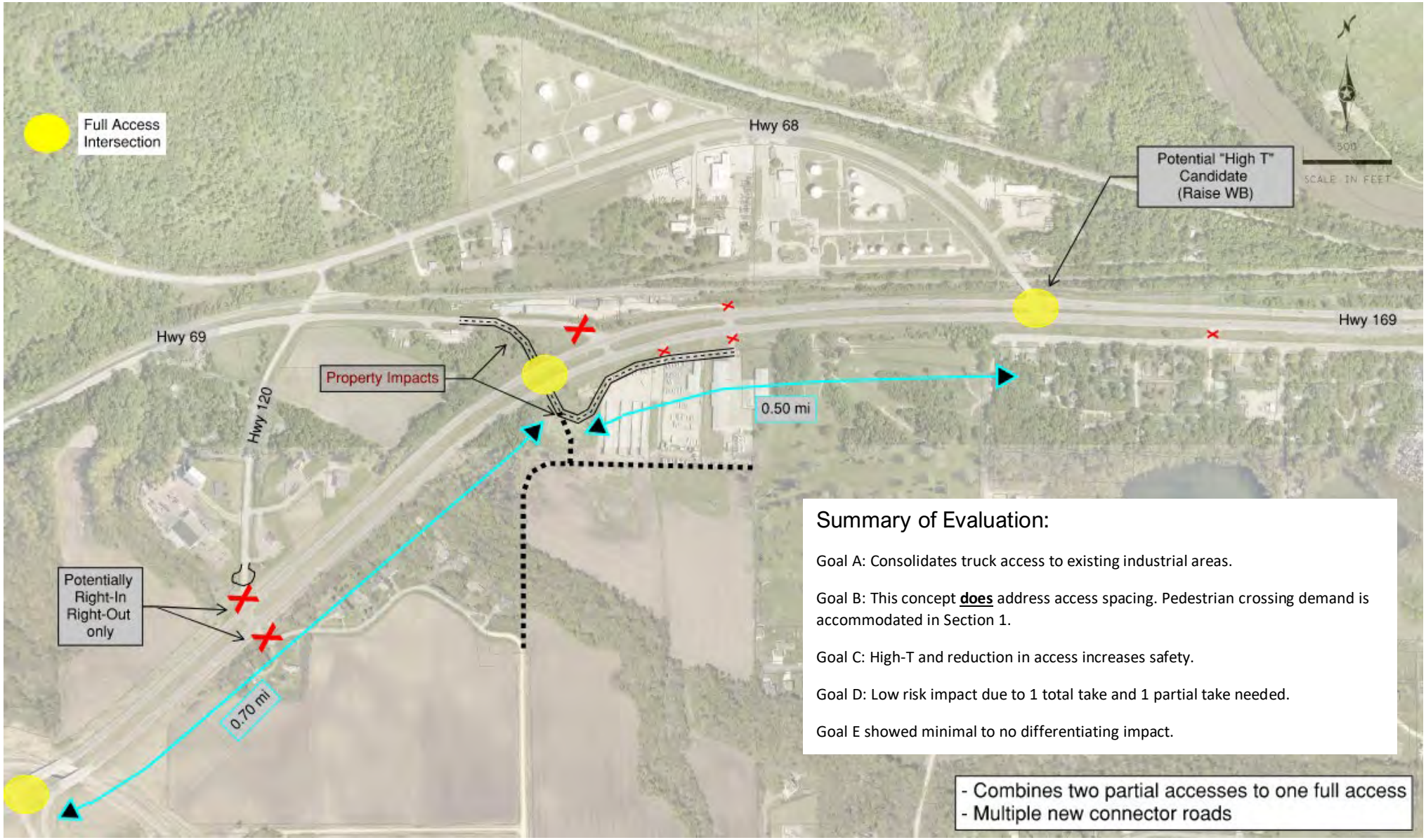
Goal A: Provides good local access.

Goal B: Does not meet access spacing guidelines. Pedestrian crossing demand is accommodated in Section 1.

Goal C: High-T and reduction in access increases safety.

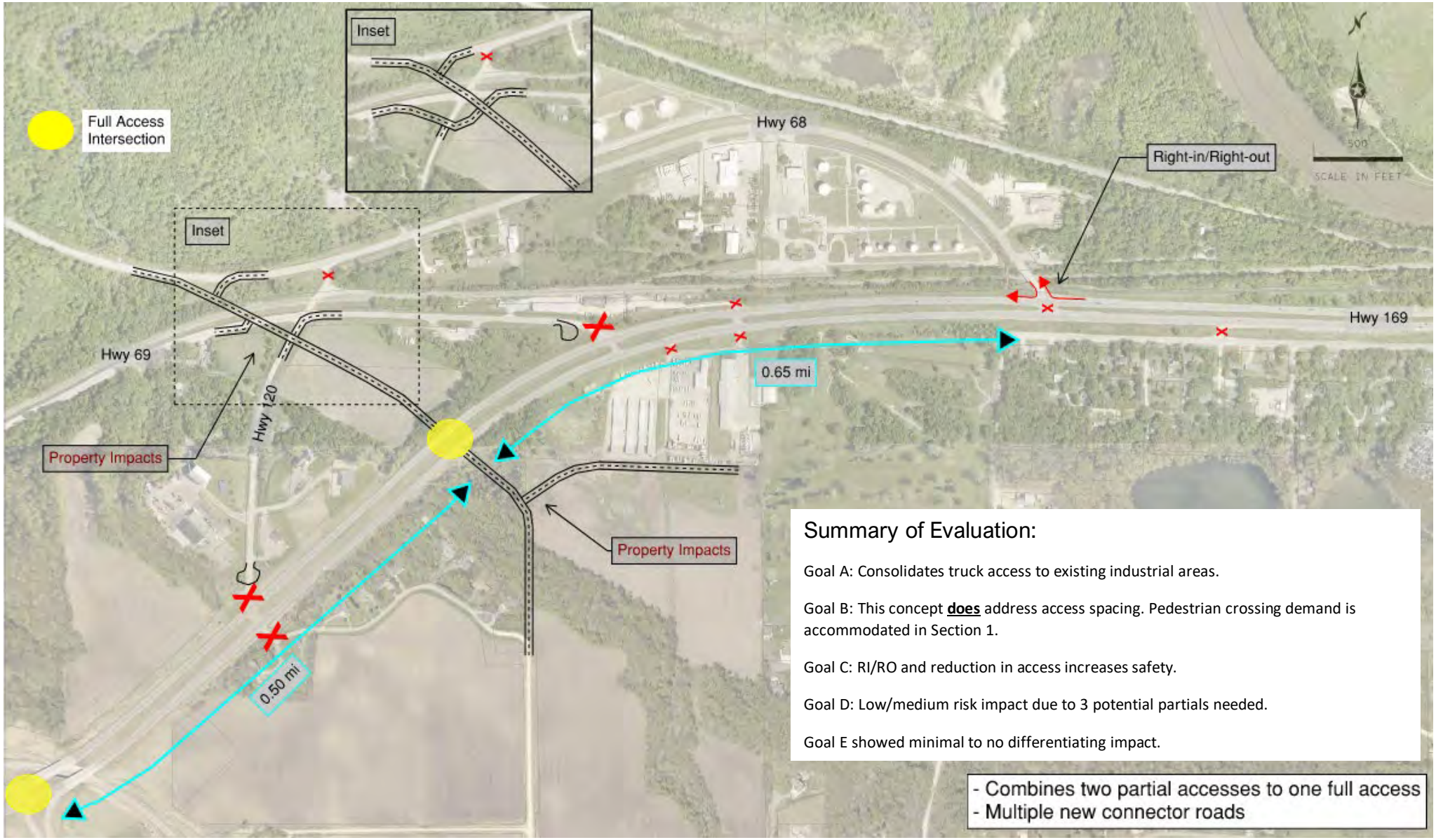
Goal D: Low risk impact due to 1 partial take needed south of CSAH 69.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.


Full Access Intersection
Hwy 68
Potential "High T" Candidate (Raise WB)
500
SCALE IN FEET
Hwy 69
Hwy 120
Hwy 169
Property Impacts
0.50 mi
Potentially Right-In Right-Out only
0.70 mi
Summary of Evaluation:
Goal A: Consolidates truck access to existing industrial areas.
Goal B: This concept does address access spacing. Pedestrian crossing demand is accommodated in Section 1.
Goal C: High-T and reduction in access increases safety.
Goal D: Low risk impact due to 1 total take and 1 partial take needed.
Goal E showed minimal to no differentiating impact.
- Combines two partial accesses to one full access
- Multiple new connector roads

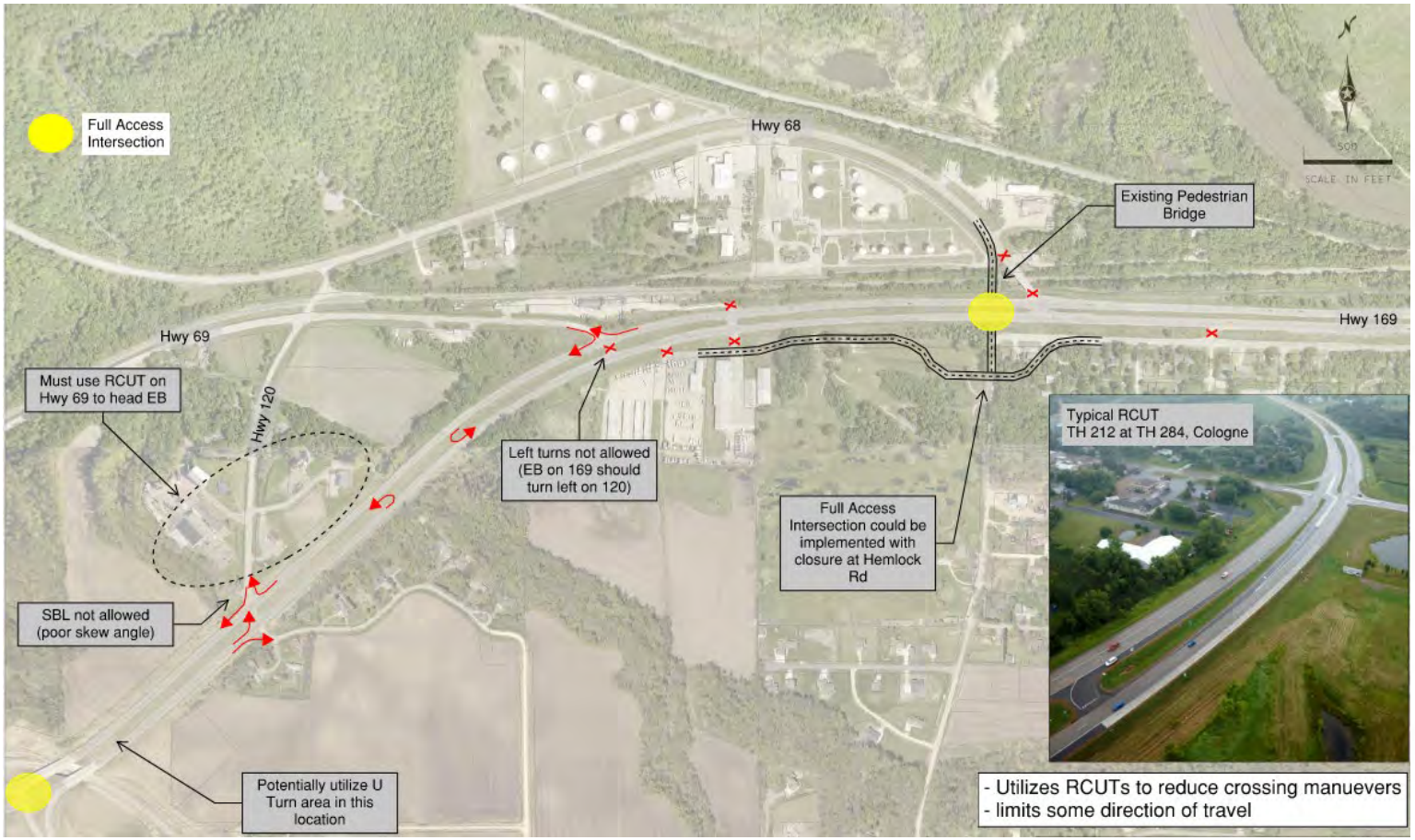
Southern Subarea Concepts

Section 2: Concept 2B2 (Opportunity/Development/Safety Driven)



Southern Subarea Concepts

Section 2: Concept 2C



CONCEPT EVALUATION

GOOD ++ | FAIR + | POOR -

Project Goals	Overall Score
Community connections & economic vitality	+
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	+
Fiscally responsible - $9M	+
Agency support	++

SCORE 126

Summary of Evaluation:

Goal A: RCUTs would increase travel time and result in consolidated truck access to existing industrial areas.

Goal B: Does not meet access spacing guidelines. Pedestrian crossing demand is accommodated in Section 1.

Goal C: RI/RO and reduction in access increases safety.

Goal D: Higher risk impact due to 3 total takes and 4 partial takes needed.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

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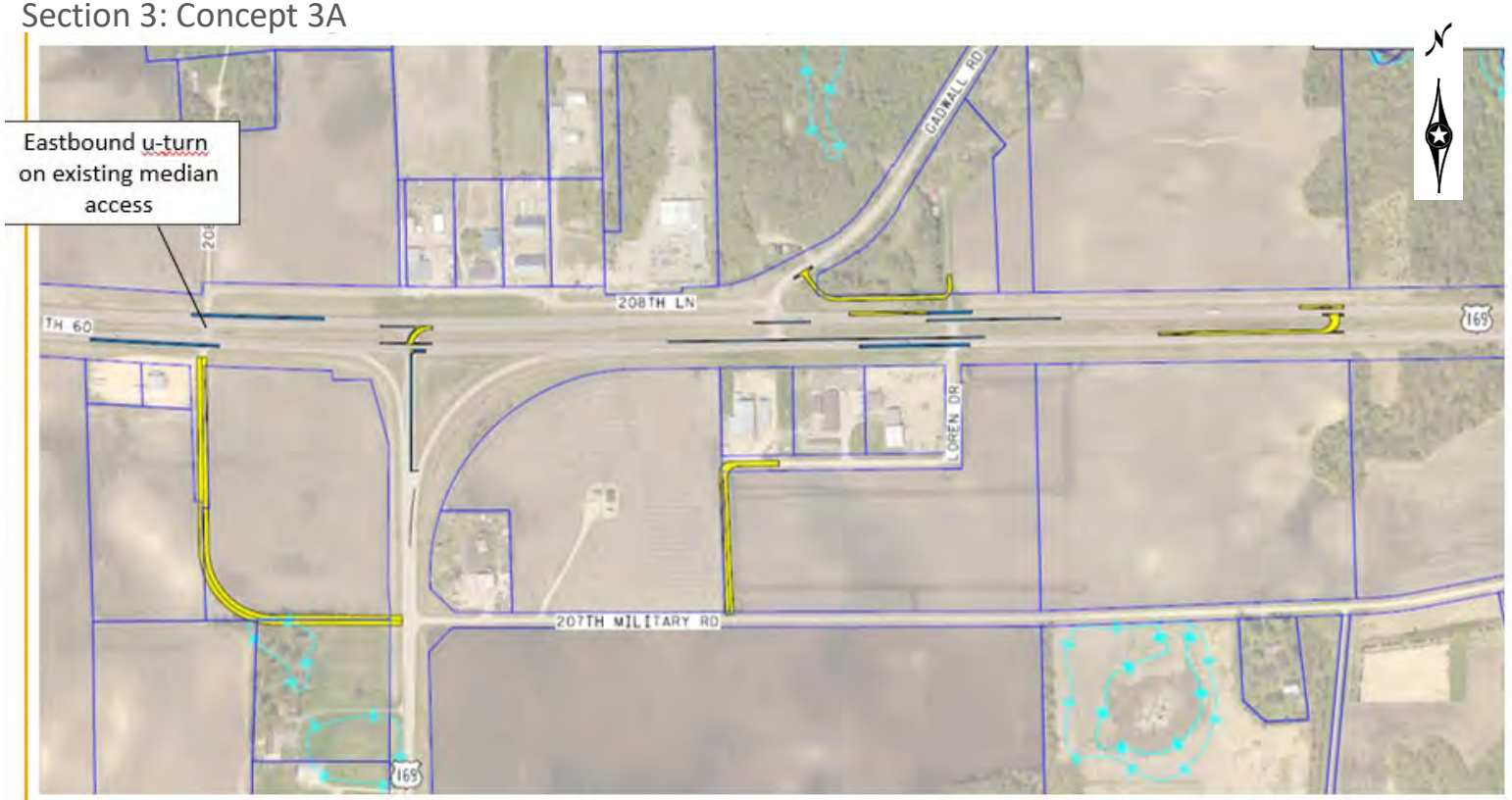
Southern Subarea Concepts

Section 3: Concept 3A



CONCEPT EVALUATION

GOOD FAIR POOR

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	+
Fiscally responsible - $1.9M	++
Agency support	++

SCORE 157.5

Summary of Evaluation:

Goal A: Good local access.

Goal B: Improves access spacing over existing conditions. Pedestrian access not a consideration in this section due to rural character.

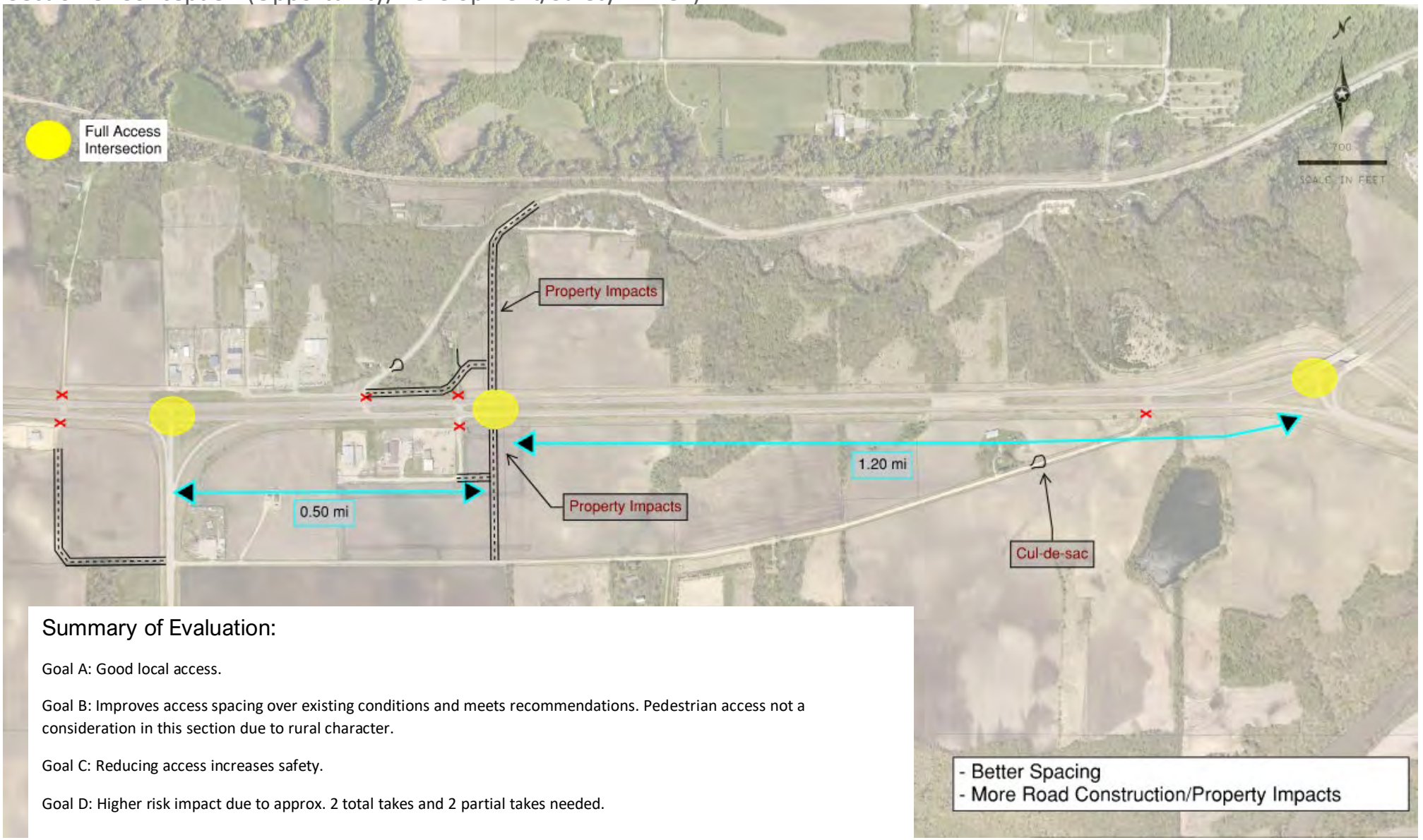
Goal C: Reducing access increases safety.

Goal D: Medium risk impact due to approx. 5 partial takes throughout the area.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

Southern Subarea Concepts

Section 3: Concept 3B (Opportunity/Development/Safety Driven)



Summary of Evaluation:

Goal A: Good local access.

Goal B: Improves access spacing over existing conditions and meets recommendations. Pedestrian access not a consideration in this section due to rural character.

Goal C: Reducing access increases safety.

Goal D: Higher risk impact due to approx. 2 total takes and 2 partial takes needed.

VII. Concept Updates

The following concept updates were made based on feedback at and following the July 2021 focus group meetings and public open house.

Northern Subarea

Concept 2C – Highway 14/169 Interchange (Eastbound Ramp Signal)

After further evaluation, Concept 2C was updated since a crash issue does not currently exist at the loop ramps. This update retains the southbound to eastbound loop ramp which keeps this a free-flowing movement and reduces the number of phases needed at the signalized intersection.

SCORE 183

Summary of Evaluation:

Goal B: Average side street delay is significantly reduced from the no build scenario.

Goal C: Increase in total number of crashes anticipated with adding traffic signal.

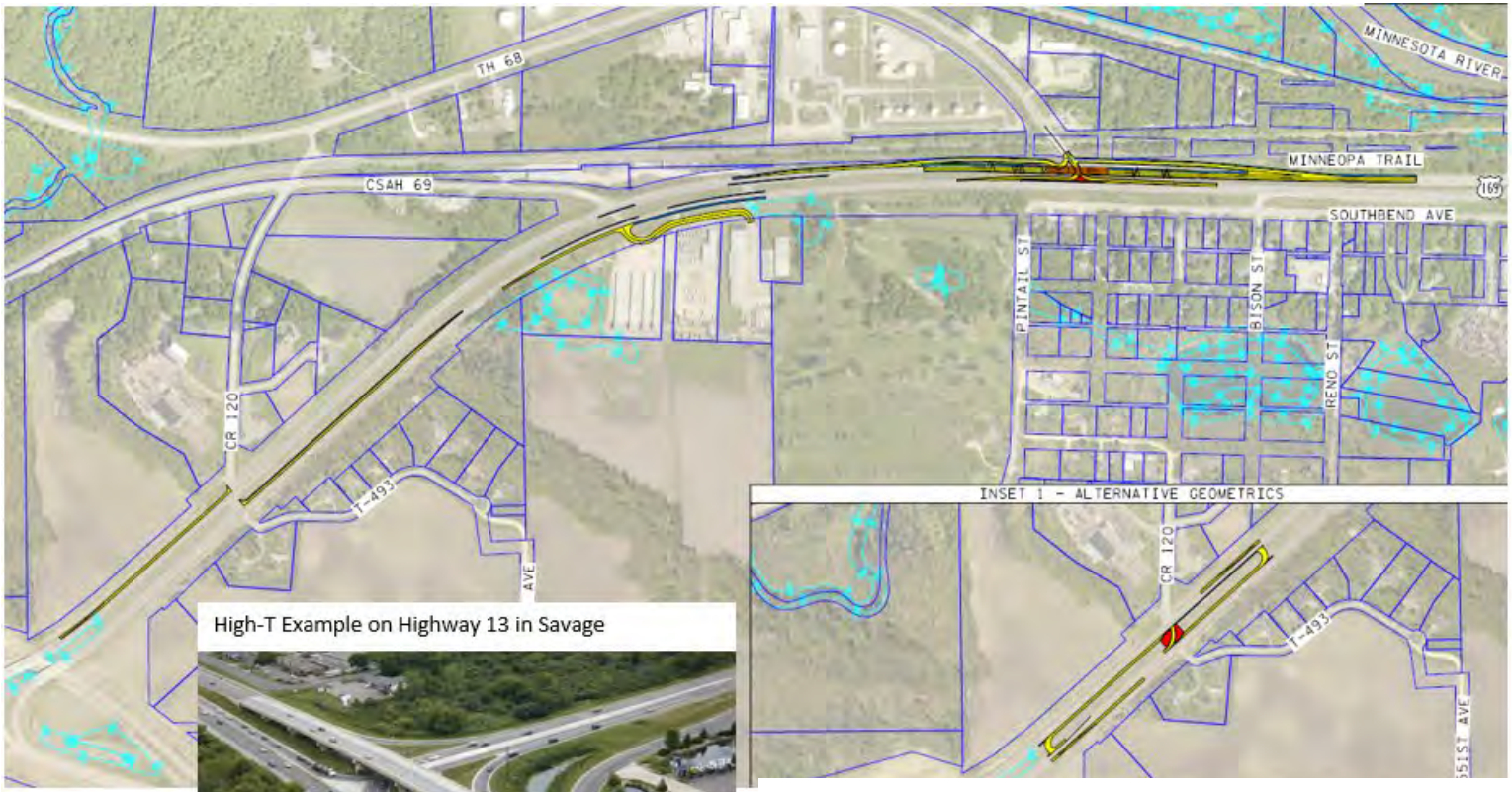
Goal D: Alone poses low risk and further evaluation needed relative to what it is paired with for improvements to the south.

Goal A and E showed minimal to no differentiating impact.

Southern Subarea

Concept 2A

This concept update addresses concerns the project team heard from the owner of Benco Electric Cooperative, a business located in the northeast quadrant of the County Road 120 and Highway 169 intersection, at the June 2021 focus group meetings. The Benco owner shared that their large trucks often struggle with movements on and off Highway 169 related to acceleration and deceleration necessary for merging into high-speed highway traffic. The Benco owner also shared that acceleration and deacceleration areas would also help with safety concerns of all their employees traveling to and from work around the same time.




High-T Example on Highway 13 in Savage

CONCEPT EVALUATION

GOOD ++ FAIR + POOR -

Project Goals	Overall Score
Community connections & economic vitality	++
Mobility for all users	++
Safety for all users	++
Community & environmental impacts	++
Fiscally responsible- 22.2M	+
Agency support	++

SCORE 154.5

Summary of Evaluation:

Goal A: Provides good local access.

Goal B: Does not meet access spacing guidelines. Pedestrian crossing demand is accommodated in Section 1.

Goal C: High-T and reduction in access increases safety.

Goal D: Low risk impact due to 1 partial take needed south of CSAH 69.

Goal E: The cost estimate does not cover all partial property impacts or any easements necessary.

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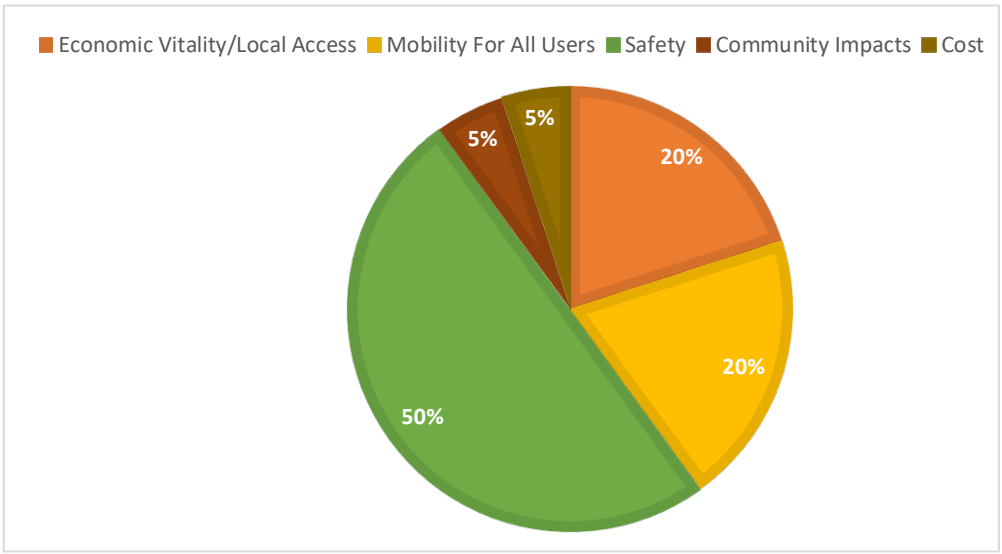
VIII. Final Concept Scoring

A score was determined for each concept to measure its overall benefit and how it compared to others. Each goal was broken down into objectives. The objectives vary by subarea and are shown in **Appendix A**. As shown on the matrices, concepts that did not meet the objective or presented a high risk was given -6 points, a minimally met objective or medium risk was given 3 points and met objective or low risk was given 9 points. The PMT then weighted the importance of each goal. Based on the goal weights shown in **Figure 6**, concept scoring relative to each goal was multiplied by its assigned weight.

Figure 6. Study Goal Weighting Breakdown



Based on the scores received for each concept, the study team conducted a planning-level Benefit Cost Analysis and graphed the results for the Northern and Southern Subareas. The Benefit Cost Analysis assumed infrastructure costs in 2022 dollars. The planning level costs including 20% contingency and 20% for design and construction engineering fees. Right of way costs were not included in the planning level benefit cost analysis shown below. See **Figures 7 – 11** on the following pages.

Figure 7. Northern Subarea Expressway Benefit Cost Analysis

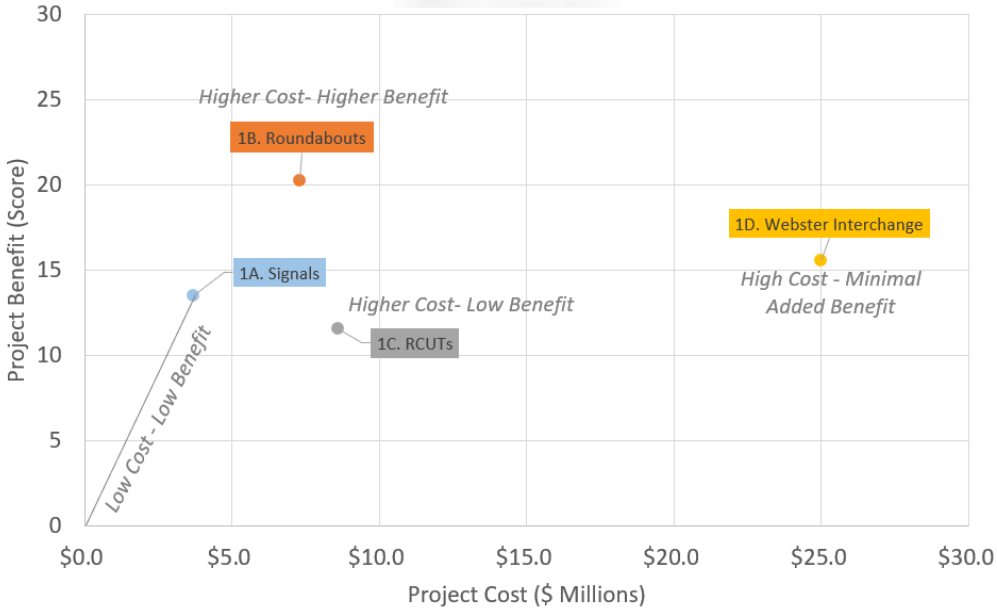


Figure 7 shows the benefit cost analysis for the concepts at Lind Street, River Lane and Webster Avenue in the Northern Subarea. This indicates that Concept 1B (Roundabouts) offers a high benefit, but at a higher cost than the Concept 1A (Signals). Concept 1A (Signals) and Concept 1C (RCUTs) have lower costs, but also offer a lower overall benefit. Concept 1D (Webster Interchange) has a much higher cost minimal added benefit compared to Concepts 1A and 1C.

Figure 8. Northern Subarea (Highway 14 Interchange) Benefit Cost Analysis

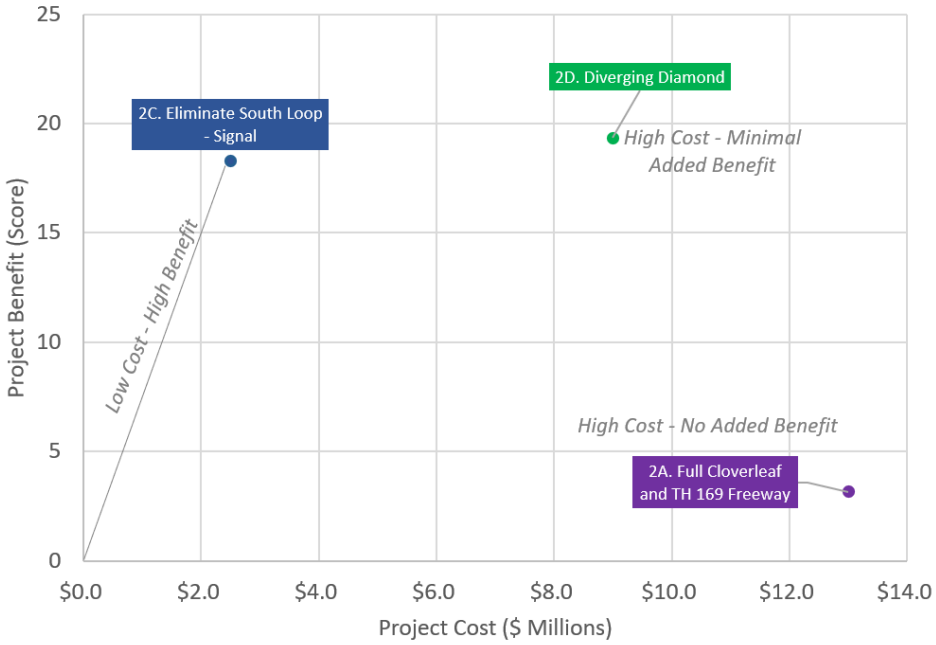


Figure 8 shows the benefit cost analysis for the Highway 14 interchange concepts in the Northern Subarea. This shows that Concept 2C (Eliminate South Loop - Signal) provides the best cost to benefit ratio. This concept has a high benefit at a low cost. Concept 2D (Diverging Diamond) has a higher cost but offers minimal additional benefit. Concept 2A (Full Cloverleaf and TH 169 Freeway) has a much higher cost but offers minimal benefit.

Figure 9. Southern Subarea – Section 1 Benefit Cost Analysis

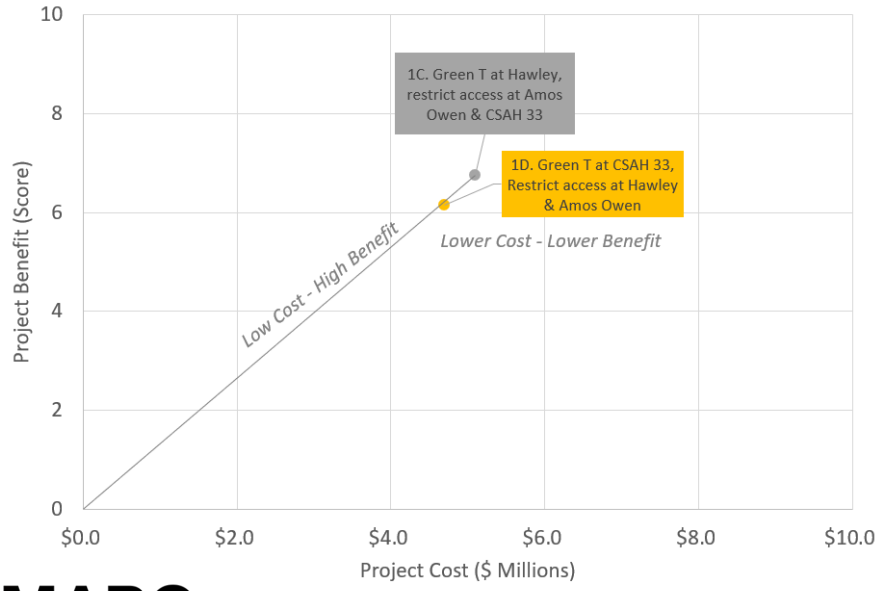


Figure 9 shows the benefit cost analysis for the Section 1 concepts in the Southern Subarea. The shows that Concept 1C (Green T at Hawley Street) provides the best cost to benefit ratio. This concept has the highest benefit at a lower cost. Concept 1D (Green T at CSAH 33) has a lower cost, but also offers a lower overall benefit.

Figure 10. Southern Subarea – Section 2 Benefit Cost Analysis

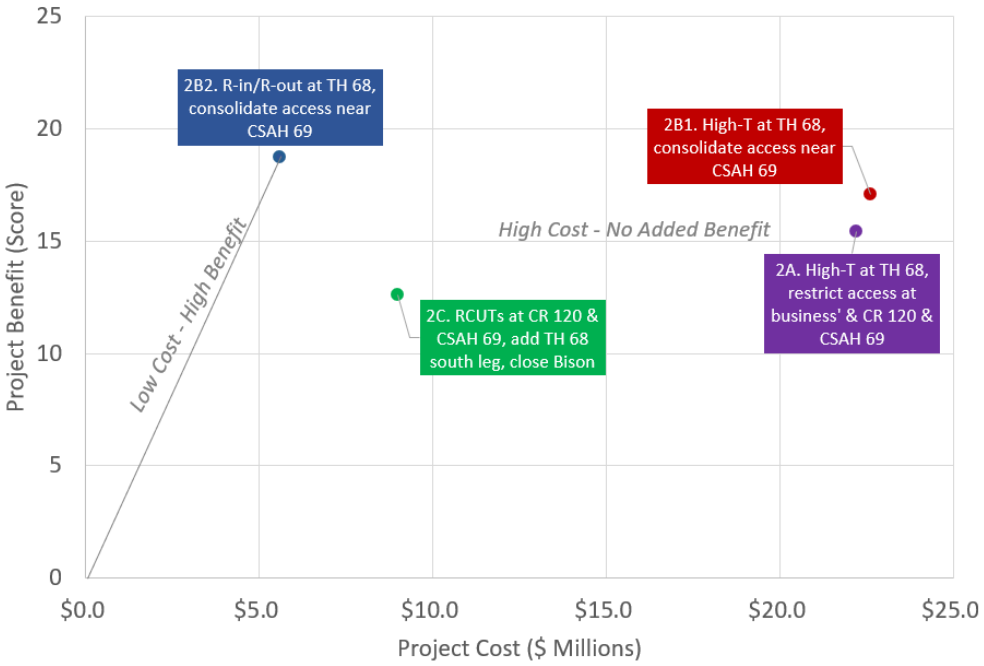


Figure 10 shows the benefit cost analysis for the Section 2 concepts in the Southern Subarea. The shows that Concept 2B2 provides the best cost to benefit ratio. This concept has the highest benefit and the lowest cost. Concepts 2A, 2B1, and 2C all have higher costs and offer a lower benefit.

Figure 11. Southern Subarea – Section 3 Benefit Cost Analysis

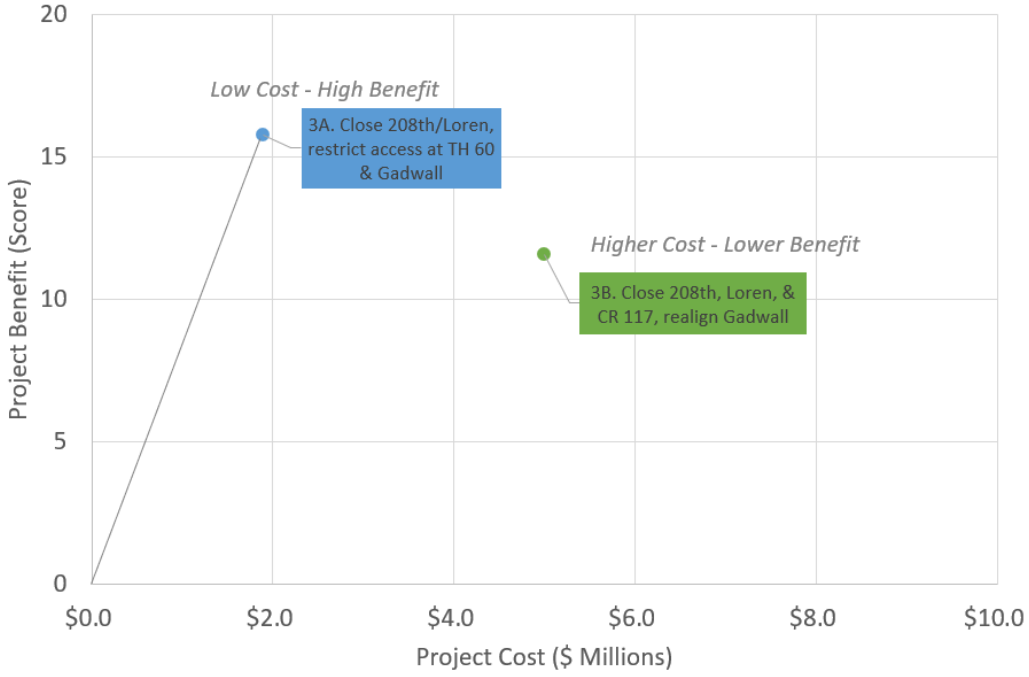


Figure 11 shows the benefit cost analysis for the Section 3 concepts in the Southern Subarea. The figure indicates that Concept 3A is the concept with the optimal cost to benefit ratio. This concept has the highest benefit at the lowest cost. Concept 3B has a higher cost and offers a lower benefit.

IX. Detailed Benefit Cost Analysis

A detailed benefit cost analysis was completed for the Northern Subarea concepts. The results of the benefit cost analysis are summarized below. For more information see the full documentation of the benefit cost analysis process in **Appendix F**. Safety and delay benefits were analyzed over a 20-year project lifespan and compared to the overall project cost to determine which concepts are anticipated to have a greater benefit than cost and which have benefits that do not offset the cost. The results of the benefit cost analysis are summarized in **Table 4** below for the Lind/River/Webster concepts and **Table 5** for the TH 14 Concepts. The total cost listed includes right of way acquisition for full take properties. Only concepts 1d and 2a were assumed to have full property takes based on the planning level concepts. The cost of acquiring the properties was assumed to be three times the current market value of the property. For concept 1d, six of the properties adjacent to the existing TH 169 and Webster Ave intersection were assumed to be acquired. For concept 2a, only one property was assumed to be acquired.

Table 4. Benefit-Cost for Lind/River/Webster Concepts

Concepts	Safety Benefit	Delay Benefit	Total Cost	B/C Ratio
Concept 1a. Signalized Expressway	$ -	$ (9,762,231)	$ 3,700,000	**-2.64**
Concept 1b. Roundabout Expressway	$ 386,419	$ 19,284,962	$ 7,300,000	**2.69**
Concept 1c. RCUT Expressway	$ 7,798,000	$ (16,013,057)	$ 8,600,000	**-0.96**
Concept 1d. Interchange at Webster	$ 14,711,915	$ 74,206,498	$ 29,431,000	**3.02**

Table 4 indicates that concepts 1b and 1d both have anticipated benefits that are higher than project costs. Since concepts 1a and 1c have benefit cost ratios less than one, the anticipated benefits do not offset the cost. Delay benefits for the concepts 1a and 1c were found to be negative as delay is increased overall with these options.

Table 5. Benefit-Cost for TH 14 Concepts

Concepts	Safety Benefit	Delay Benefit	Total Cost	B/C Ratio
Concept 2a. Full Cloverleaf Interchange (lower end)	$ 2,458,951	$ 91,765,194	$ 17,079,000	**5.52**
Concept 2a. Full Cloverleaf Interchange (higher end)	$ 2,458,951	$ 91,765,194	$ 26,079,000	**3.61**
Concept 2c. Eliminate South Loop - Signal	$ (11,782,418)	$ 52,640,901	$ 2,500,000	**16.34**
Concept 2d. Diverging Diamond	$ (3,886,305)	$ 49,628,565	$ 9,000,000	**5.08**
Concept 2f. Signalize EB TH 14 Exit Ramp	$ (1,279,631)	$ 82,151,540	$ 500,000	**161.74**

Table 5 indicates that all of the TH 14 concepts have anticipated benefits that are higher than the project costs. Safety benefits for the concepts 2c, 2d, and 2f were found to be negative as crashes are

anticipated to increase with these options. Concept 2f shows the highest benefit cost ratio as this concept offers a significant delay benefit at a low cost.

It should be noted for the freeway design (Concepts 1d and 2a), the full cost of these projects is likely underrepresented. The total right-of-way and relocation costs are difficult to predict at a planning-level without detailed designs. As noted above, only full property acquisitions are currently included in the cost calculation. Relocation costs are not included. In addition, both cities have identified additional potential costs due to business closures and reductions in tax base. These costs are also not factored in at this point. Because of these additional influences, it should be anticipated that the total project cost for these concepts will go up and the Benefit/Cost Ratios for each will be reduced.

X. Implementation Plan

The implementation plan is depicted in tables for the Northern and Southern Subareas in Appendix G. The separate subarea tables prioritize standalone projects to be strategically and incrementally implemented over the next fifteen or more years. Timing of projects is organized into short-term (0-5 years), mid-term (6-15 years), or projects that are opportunity driven or only necessary with increased development or rise in safety issues. The mid-term projects are meant to align with MnDOT's planned investments for 2027, particularly in the Northern Subarea. The overall implementation timeframes also coincide with the MAPO Long-Range Transportation Plan (LRTP) implementation timeframes for short-term (2021-2025) and Mid-Term 1 (2026-2030). The Highway 169 Corridor Study implementation plan does not have any projects that would align with the LRTP's Mid-Term 2 (2031-2035) or Long-Term (2036-2045). All remaining Highway 169 recommendations are shown in the Opportunity/Development/Safety Driven implementation category.

The detailed benefit cost analysis for the Northern Subarea determined that a freeway (full cloverleaf Concept 2D) is not needed for operations projected out to 2040. The signalized exit ramp (Concept 2f) showed comparable delay benefits at significantly less cost. The roundabout express way (Concept 1B) showed comparable benefits with significantly less cost to the Webster Avenue interchange (Concept 1D) out to 2040. The roundabout express way (Concept 1B) is also a concept supported by local agencies and the public including the freight generating businesses.

In summary, the freeway concepts are not included in the vision and implementation plan because of the lower-cost/high-benefit alternate solutions that are recommended.

XI. Next Steps

Additional design, studies and public input will be needed for each of the recommended improvement concepts to move forward. The purpose of the Highway 169 Corridor Study was to develop a long-term plan for improvements. The concepts developed as part of this study are high-level and will need additional refinement through preliminary and final design. Environmental review and permitting will also be required with exact requirements based on the scope of the project and the funding source. See **Appendix D** for environmental screening considerations and considerations for concept scores. Also see the Existing Conditions Report for more detail on the study environmental review.

The improvement concepts identified within this study and the projects prioritized as part of the implementation plan will help the Mankato Area Planning Organization (MAPO), MnDOT and the Cities of Mankato, North Mankato, Blue Earth County, and Nicollet County to continue to maintain a functioning yet safe principal arterial roadway.

Study partners must continue to work together to further plan, obtain funding, design, and implement the recommended improvement projects. All partners have an active role in implementing these improvements. All competitive funding sources should be considered. Agencies should also update their comprehensive and transportation plans to include these findings to better leverage funding sources.

Evaluation Memo Appendix A

SUBAREA EVALUATION MATRICES

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

Highway 169 Evaluation

Northern Subarea Concept Evaluation Summary

Does Not Meet Measure/ High Risk: -6 pts | Minimally Meets Measure/ Medium Risk: 3 pts | Meets Measure/ Low Risk: 6 pts

Goals	Objectives	No Build	Highway 169 Concepts								Notes
			1a	1b	1c	1d	2a	2b	2c	2d	2e	
			Signalized Expressway	RAB Expressway	RCUT Expressway	Freeway	Freeway	Spot Interchange - Expressway				
			Combined River Ln / Lind St and Webster Ave Remain Signalized	Combined River Ln / Lind St RA and Webster Ave Roundabouts	Combined River Ln / Lind St RCUT and Webster Ave RCUTs	Webster Ave Interchange	TH 14 Interchange Full Cloverleaf and TH 169 Freeway	TH 14 Interchange Eliminate South Loop - Roundabout	TH 14 Interchange Eliminate South Loop - Signal	TH 14 Interchange Diverging Diamond	TH 14 Interchange RA Ramp Intersections	
GOAL A: Preserve community connections and economic vitality.	Maintain sustainable access for local trips into/out of Mankato and North Mankato.	Baseline										Quantitative - travel time and network efficiency 2a Freeway will result in increased travel time from TH 14 to area around McDonalds and Lind Street
	Maintain emergency access routes into/out of Mankato and North Mankato.	Baseline										Qualitative - design, system connectivity, traffic calming impacts to response times
	Accommodate reasonable vehicle/truck access											Qualitative - Agency and public perception
	Accommodate reasonable ped/bike access						NA	NA	NA	NA	NA	Qualitative - Agency and public perception
	Enhance community identity.											Qualitative - median areas provide opportunity for aesthetics/monumentation. Traffic signals do not include median areas along side street approaches. Large cloverleaf footprint provides limited opportunities for aesthetic improvements. Sightline concerns with RCUT medians.
GOAL B: Provide efficient and reliable mobility for all users.	Provide acceptable system reliability serving existing and planned growth.											Quantitative - serves existing and forecasted ADT 2b does not improve problematic operations at the EB TH 14 exit ramp 2e causes excessive delay and queuing for WB TH 14 to SB TH 169 movement
	Provide acceptable regional highway travel times while accommodating reliable local access.	Baseline				Did not model this option	Did not model this option					Quantitative - average through trip travel time Green - adds <60 seconds Yellow - adds 60-120 seconds Red - adds 120+ seconds
	Provide acceptable side street delay	EBL/R (TH 14) operates with LOS F	Several movements operate with LOS E	EBL/T (Webster) and EBL/T (Lind/River) operate with LOS F	Several movements operate with LOS E	Did not model this option	Did not model this option	EBL/R (EB TH 14 Exit Ramp) operate with LOS F	EBL & SBL (EB TH 14 Exit Ramp) operate with LOS E		WBL/R & SBR (WB TH 14 Exit Ramp) and EBL/R (EB TH 14 Exit Ramp) operate with LOS F	Quantitative - side street LOS Green: All side street movements operate with LOS A - D Yellow: Side street movements operate with LOS E Red: Side street movements operate with LOS F
	Improves side street delay over existing conditions	Baseline	Average Side Street Delay: 50 seconds/vehicle (Lind/River and Webster)	Average Side Street Delay: 23 seconds/vehicle (Lind/River and Webster)	Average Side Street Delay: 35 seconds/vehicle (Lind/River and Webster)	Did not model this option	Did not model this option	Average Side Street Delay: 402 seconds/vehicle (EB TH 14 Exit Ramp)	Average Side Street Delay: 23 seconds/vehicle (EB TH 14 Exit Ramp)	Average Side Street Delay: 19 seconds/vehicle (EB and WB TH 14 Exit Ramps)	Average Side Street Delay: 115 seconds/vehicle (EB and WB TH 14 Exit Ramps)	Quantitative - Reduction in side street delay Green: Side street delay is reduced from the no build scenario Yellow: Side street delay remains the same as the no build scenario Red: Side street delay is increased from the no build scenario Baseline/2040 No Build Average Peak Hour Side Street Delay: Lind/River/Webster: 32 seconds/vehicle [comparison for 1a-1c] EB TH 14 Exit Ramp: 361 seconds/vehicle [comparison for 2b and 2c] EB and WB TH 14 Exit Ramps: 125 seconds/vehicle [comparison for 2d and 2e]
	Understand and plan for freight needs.											Qualitative - adequate access and truck turning movements to existing and planned industrial areas
	Meets access spacing guidelines.	Recommended spacing is only met from River Ln to Monroe Ave	0.22 miles between TH 14 and River/Lind	0.22 miles between TH 14 and River/Lind	0.08 miles between TH 14 and River/Lind NB U-Turn	0.41 miles between TH 14 and Webster Interchange	NA - Depends on pairing	NA - Depends on pairing	NA - Depends on pairing	NA - Depends on pairing	NA - Depends on pairing	Quantitative - meets access spacing guidelines. Recommended spacing is 0.5 mile from Lake St to Lind St (Subcategory A) and 0.25 mile from Lind St to Belgrade Ave (Subcategory B) according to the MnDOT Access Management Manual
	Improves access spacing over existing conditions						NA - Depends on pairing	NA - Depends on pairing	NA - Depends on pairing	NA - Depends on pairing	NA - Depends on pairing	Quantitative Green - improves access spacing Red - does not improve access spacing
	Provide a connected transportation system that accommodates trips consistent with roadway functional class.											Qualitative - are the right trips on the right roads per functional classification

	Perceived pedestrian/bicyclist level of comfort.						NA	NA	NA	NA	NA	Qualitative = Signalized intersections give pedestrian "WALK" indication, but traffic is traveling at a higher speed; Roundabout reduces traffic speed and pedestrian-vehicle conflict points but crossing relies on vehicles yielding to pedestrian; RCUT requires all red phase to accommodate pedestrians; An interchange would grade separate pedestrians from mainline TH 169 traffic
	Accommodate future transit plans and needs.											Qualitative
	Understand and plan for roadway expansion needs.											Qualitative - infrastructure can be built for future expansion
GOAL C: Safely accommodate all system users.	Reduce crash and severity rates.											Quantitative - Retaining traffic signal would not reduce crash/severity rates; 2x1 roundabouts would likely increase crashes but reduce crash severity; RCUTs have been shown to reduce crash/severity rates; Full cloverleaf introduces new weave areas; Signal (2c) would reduce angle crashes but likely increase rear end crashes; DDI would add signals likely increasing rear end crashes
	Provide safe pedestrian and bicycle travel near and across roadways, to area schools, and to regional destinations.	16	16	8*	14	Did not draw this concept	NA	NA	NA	NA	NA	Quantitative - number of vehicle-pedestrian conflict points. *Roundabout concept drawing shows pedestrian facilities on all legs of Lind/River intersection but conflict points were only counted for the crossing on the south leg as the other concepts assumed pedestrian facilities on south leg only (Webster and Lind/River).
GOAL D: Provide infrastructure improvements that respect the environment.*	Avoid, minimize, and mitigate impacts to historic properties.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis
	Avoid, minimize, and mitigate impacts to cultural resources.	Low Risk	Medium Risk	Medium Risk	Medium Risk	Low Risk	Medium Risk	Low Risk	Low Risk	Medium Risk	Medium Risk	Quantitative - New road alignment north of Hiniker Pond and TH 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project.
	Avoid, minimize, and mitigate impacts to the built environment.	0 takes	4 partial takes	4 partial takes	4 partial takes	6 total and 4 partial takes	1 total and 2 partial takes	0 takes	0 takes	0 takes	0 takes	Quantitative - TH 169 N to US 14 E ramp would impact McDonalds building
	Avoid, minimize, and mitigate impacts to sensitive environmental resources.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	High Risk	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - The full interchange configuration Option 2A would warrant modifications to the Minnesota River flood control structure that protects the City of Mankato and North Mankato from flood waters produced by the Minnesota River. Further coordination with FEMA will be required to understand the requirements associated with levee modifications or relocations associated with Option 2A. - US 14 W to TH 169 ramp would impact the existing wetland in the NE quadrant.
	Avoid, minimize, and mitigate impacts to hazardous contaminated areas.	Low Risk	Medium Risk	High Risk	High Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Based on environmental screening there are several hazardous waste areas south of the TH 14 interchange, most south of Hiniker Pond
	Disproportionate impact to EJ populations	High Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	This is a two pronged analysis with a yes (red cell) or no (green cell) rating. 1) To have an EJ impact, there must first be an impact. In other words, a red cell somewhere else in this table. 2) If there is an impact, we need to determine if it will be "disproportionately high" on EJ communities. Because there are no EJ residences within close proximity in the northern sub area (they are east of the river) and because we have no data to lead us to believe that EJ populations use this area significantly more than other populations (i.e., travel to the corridor or drive through it), there is no reason to assume impacts would be disproportionately high.
GOAL E: Develop a financially responsible implementation plan.	Right-size improvements to address needs yet maximize use of existing infrastructure where possible.	Baseline										Quantitative - general project footprint, retaining walls, etc.
	Develop fiscally responsible improvements (construction cost)	Baseline	$ 3.7M	$ 7.3M	$ 8.6M	$$$ 25M	$$ 13M	$ 4.6M	$ 2.5M	$ 9M	$ 8.7M	Quantitative - high level construction project cost in 2023 dollars, contingency, engineering. Does not include R/W or environmental (levee recontsruction) $ = 1-10M, $$ = 10-20M, $$$ = 20M+
	Develop fiscally responsible improvements (Impact (ROW and Env) costs)	Baseline	Medium Risk	Medium Risk	Medium Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk	Low Risk	Alternatives 1a, 1b, 1c – involve the realignment of the Lind St./River Ln. intersection, a "Medium" risk. Alternative 1d – the Webster interchange alternative involves several parcel impacts resulting in a "High" risk rating. Alternative 2a – this alternative carries the same parcel impacts as Alt. 1d, and additional property and environmental impacts at the Hwy 14/169 interchange. Alternatives – 2b, 2c, 2d, 2e – all improvements maintained within existing ROW with no environmental concerns.
	Develop project phases that meet schedule and funding constraints and maximize opportunities.	Baseline										Qualitative - ability to be phased with MnDOT investment plans and agency funding availability
	Develop a supported funding model to clearly identify agency responsibilities.	Baseline										Qualitative - combination of funding competitiveness and agency support
	Position partner agencies to seek federal and state grants for identified improvements to minimize partner costs.	Baseline										Qualitative - Funding competitiveness based on concept ability to reduce/eliminate severe and fatal crashes, improve non-motorized safety and mobility, and gain agency/community support.
GOAL F: Develop a plan supported by all agency partners.	Supported by the PMT											Quantitative

***Assessment based on planning-level concepts and will require further review to verify actual impacts.**

Weighted Scores

Goal A	6	60	60	-12	-12	-24	48	42	48	48
Goal B	-66	66	72	60	120	96	0	90	96	18
Goal C	-15	-15	45	45	60	-30	15	15	15	15
Goal D	12	13.5	9	9	6	-1.5	18	18	16.5	16.5
Goal E	0	10.5	16.5	13.5	-18	-9	6	18	18	6
Preliminary Total Score	-63	135	202.5	115.5	156	31.5	87	183	193.5	103.5

Weighting Percent Per Goal
2
2
5
0.5
0.5

Highway 169 Evaluation

Northern Subarea Grade Separated Pedestrian Crossings

Does Not Meet Measure/ High Risk	-6 pts
Minimally Meets Measure/ Medium Risk	3 pts
Meets Measure/ Low Risk	6 pts

Goals	Objectives	No Build	Grade Separated Ped Crossings			Notes
			A	B	C	
			Across TH 169 & MN river using existing TH 14 bridges	Crossing north of Lind St	Crossing south side of Webster Ave	
GOAL A: Preserve community connections and economic vitality.	Provide convenient pedestrian and bicycle access to regional destinations.	Baseline				Qualitative - Webster Ave is more of a local destination than a regional destination in comparison to Lind Court and Lind Street destinations and connections to existing regional trails.
GOAL B: Provide efficient and reliable mobility for all users.	Perceived pedestrian/bicyclist level of comfort.					Quantitative - No Build gives pedestrian "WALK" indication, but traffic is traveling at a higher speed; Utilizing the existing TH 14 bridges will not completely separate peds/bikes from traffic like standalone ped bridges will.
GOAL C: Safely accommodate all system users.	Reduce crash and severity rates.					Quantitative
	Provide safe pedestrian and bicycle travel near and across Highway 169.	16	0	0	0	Quantitative - number of vehicle-pedestrian conflict points
GOAL D: Provide infrastructure improvements that respect the environment.*	Avoid, minimize, and mitigate impacts to historic properties.	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative -Will require future detailed analysis.
	Avoid, minimize, and mitigate impacts to cultural resources.	Low Risk	Medium Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis of grades and alignments. Trail connections needed with the TH 14 bridges connection could potentially disturb areas along the MN River.
	Avoid, minimize, and mitigate impacts to the built environment.	0 takes	0 takes	1 partial impact	1 partial impact	Quantitative - Will require future detailed analysis of grades and bridge type foot print. Built out environment could result in some partial property impacts.
	Avoid, minimize, and mitigate impacts to sensitive environmental resources.	Low Risk	Medium Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis of grades and alignments. Trail connections needed with the TH 14 bridges connection could potentially disturb areas along the MN River.
	Avoid, minimize, and mitigate impacts to hazardous contaminated areas.	Low Risk	Low Risk	Low Risk	Medium Risk	Quantitative - Will require future detailed analysis. Based on environmental screening there are several hazardous waste areas south of the TH 14 interchange, most south of Hiniker Pond.
	Disproportionate impact to EJ populations	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Low risk given consideration all proposed roadway concepts provide more safe and connected at grade crossings than existing conditions and a pedestrian bridge could be paired with any improvement concept.
GOAL E: Develop a financially responsible implementation plan.	Right-size improvements to address needs yet maximize use of existing infrastructure where possible.	Baseline				Quantitative - general project footprint, retaining walls, etc.
	Develop fiscally responsible improvements	Baseline	$$ 4M	$$ 4M	$$ 5M	Quantitative - high level project cost in 2023 dollars, contingency, engineering $ = 1-3M, $$ = 4-6M, $$$ = 6M+
	Develop project phases that meet schedule and funding constraints and maximize opportunities.	Baseline				Qualitative - ability to be phased with MnDOT investment plans and agency funding availability
	Develop a supported funding model to clearly identify agency responsibilities.	Baseline				Qualitative - combination of funding competitiveness and agency support
	Position partner agencies to seek federal and state grants for identified improvements to minimize partner costs.	Baseline				Qualitative - Funding competitiveness based on concept anticipated use, ability to reduce/eliminate severe and fatal crashes, improve non-motorized safety and mobility, and gain agency/community support.
GOAL F: Develop a plan supported by all agency partners.	Supported by the PMT					Quantitative

***Assessment based on planning-level concepts and will require further review to verify actual impacts.**

Highway 169 Evaluation

Northern Subarea Local System Evaluation Summary

Does Not Meet Measure/ High Risk	-6 pts
Minimally Meets Measure/ Medium Risk	3 pts
Meets Measure/ Low Risk	6 pts

Goals	Objectives	Local System Concepts				Notes
		L1	L2	L3	L4	
		Range St remains open (no change)	Range St Cul-de-Sac	Range St RIRO at Webster Ave	Range St Modernization	
GOAL A: Preserve community connections and economic vitality.	Maintain sustainable access for local trips into/out of Mankato and North Mankato.					Qualitative - design, system connectivity, and agency support
	Accommodate reasonable vehicle/truck access.					Qualitative - Agency and public perception
	Maintain emergency access routes into/out of Mankato and North Mankato.					Qualitative - design, system connectivity, traffic calming impacts to response times
GOAL B: Provide efficient and reliable mobility for all users.	Understand and plan for freight needs.					Qualitative - adequate access and truck turning movements to existing and planned industrial areas
	Meets access spacing guidelines.					Quantitative - meets access spacing guidelines, relative to Hwy 169 concepts paired with
	Accommodate future transit plans and needs.					Quantitative - Route 5 travels Range St to cross TH 169 at Belgrade Ave
GOAL C: Safely accommodate all system users.	Reduce crash and severity rates.					Quantitative - with L1 and L4 Webster Avenue will continue to see crash issues
GOAL D: Provide infrastructure improvements that respect the environment.*	Avoid, minimize, and mitigate impacts to historic properties.	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis. All options could likely be constructed within the footprint of the existing intersection.
	Avoid, minimize, and mitigate impacts to cultural resources.	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis. All options could likely be constructed within the footprint of the existing intersection.
	Avoid, minimize, and mitigate impacts to the built environment.	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis. All options could likely be constructed within the footprint of the existing intersection.
	Avoid, minimize, and mitigate impacts to sensitive environmental resources.	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis. All options could likely be constructed within the footprint of the existing intersection.
	Avoid, minimize, and mitigate impacts to hazardous contaminated areas.	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis. All options could likely be constructed within the footprint of the existing intersection.
	Disproportionate impact to EJ populations	Low Risk	Low Risk	Low Risk	Low Risk	Quantitative - Low risk given consideration that most options could be paired with any improvement concept.
GOAL F: Develop a plan supported by all agency partners.	Supported by the PMT					Quantitative

***Assessment based on planning-level concepts and will require further review to verify actual impacts.**

Highway 169 Evaluation

Southern Subarea Concept Evaluation Summary

Does Not Meet Measure/ High Risk: -6 pts | Minimally Meets Measure/ Medium Risk: 3 pts | Meets Measure/ Low Risk: 6 pts

Goals	Objectives	No Build	Highway 169 Concepts: 1a	1b	1c	1d	2a	2b1	2b2	2c	Local System Concepts: 3a	3b	Notes
			Restrict access @ Hawley & Amos Owen & CSAH 33	EB right only @ Hawley, restrict access @ Amos Owen & CSAH 33	Green T @ Hawley, restrict access @ Amos Owen & CSAH 33	Restrict access @ Hawley & Amos Owen, Green T @ CSAH 33	High-T at TH 68, restrict access @ business' & CR 120 & CSAH 69	High-T at TH 68 & consolidate access near CSAH 69	R-in/R-out at TH 68 & consolidate access near CSAH 69	RCUT's @ CR 120 & CSAH 69, add TH 68 south leg, close Bison	Close 208th/Loren, restrict access @ TH 60 & Gadwall	Close 208th & Loren & CR 117, realign Gadwall	
GOAL A: Preserve community connections and economic vitality.	Maintain sustainable access for local trips.												Quantitative - travel time and network efficiency
	Maintain emergency access routes.												Qualitative - design, system connectivity, traffic calming impacts to response times
	Accommodate reasonable vehicle/truck access												Qualitative - Agency and public perception Green: Minimal or no re-routing of trips Yellow: A few movements need to be re-routed Red: Several movements need to be re-routed
	Accommodate reasonable ped/bike access						NA	NA	NA	NA	NA	NA	Qualitative - Agency and public perception
	Enhance community identity.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Qualitative - median areas provide opportunity for aesthetics/monumentation
GOAL B: Provide efficient and reliable mobility for all users.	Provide acceptable system reliability serving existing and planned growth.		WBLs at CSAH 33 and Hawley operate with LOS F	WBL at CSAH 33 and U-Turns at RCUTs operate with LOS F	Operations are acceptable with all WBLs at Green T	Operations are acceptable with all WBLs at Green T		Did not model this option	Operations accpetable with signal at full movement access	Did not model this option		Did not model this option - But NBL at TH 60 operate with LOS F with existing control/full access	Quantitative - serves existing and forecasted ADT
	Provide acceptable regional highway travel times while accommodating reliable local access.	Baseline						Did not model this option		Did not model this option		Did not model this option	Quantitative - average through trip time Green - adds <60 seconds Yellow - adds 60-120 seconds Red - adds 120+ seconds
	Provide acceptable side street delay	Several movements operate with LOS F						Did not model this option		Did not model this option		Did not model this option - But NBL at TH 60 operate with LOS F with existing control/full access	Quantitative - side street LOS Green: All side street movements operate with LOS A - D Yellow: Side street movements operate with LOS E Red: Side street movements operate with LOS F
	Improves side street delay over existing conditions	Baseline	Average Side Street Delay: 2 seconds/vehicle	Average Side Street Delay: 2 seconds/vehicle	Average Side Street Delay: 4 seconds/vehicle	Average Side Street Delay: 5 seconds/vehicle	Average Side Street Delay: 6 seconds/vehicle	Did not model this option	Average Side Street Delay: 41 seconds/vehicle	Did not model this option	Average Side Street Delay: 2 seconds/vehicle	Did not model this option - Excessive side street delay anticipated with full access and stop control	Quantitative - Reduction in side street delay Green: Side street delay is reduced from the no build scenario Yellow: Side street delay remains the same as the no build scenario Red: Side street delay is increased from the no build scenario Baseline/2040 No Build Average Peak Hour Side Street Delay: Section 1: 327 seconds/vehicle Section 2: 51 seconds/vehicle Section 3: 102 seconds/vehicle
	Understand and plan for freight needs.												Qualitative - adequate access and truck turning movements to existing and planned industrial areas
	Meets access spacing guidelines.	Only met CSAH 33 to Bison St and CSAH 117 to Loren Dr	Alternative does not change access spacing	Alternative does not change access spacing	Alternative does not change access spacing	Alternative does not change access spacing	TH 68-CSAH 69 = 0.46 miles CSAH 69-CSAH 120 = 0.47 miles			Alternative does not change access spacing	CSAH 117 to CSAH 90 = 0.25 miles		Quantitative - meets access spacing guidelines. Recommended spacing is 0.5 mile according to the MnDOT Access Management Manual
	Improves access spacing over existing conditions												Quantitative Green - improves access spacing Red - does not improve access spacing
	Provide a connected transportation system that accommodates trips consistent with roadway functional class.												Quantitative - are the right trips on the right roads per functional classification
	Perceived pedestrian/bicyclist level of comfort						NA	NA	NA	NA	NA	NA	Qualitative - All concepts require pedestrians to cross multiple lanes of free flowing high speed traffic

	Accommodate future transit plans and needs.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Quantitative
	Understand and plan for roadway expansion needs.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Qualitative - infrastructure can be built for future expansion
GOAL C: Safely accommodate all system users.	Reduce crash and severity rates.												Quantitative - Reducing access would reduce crash rate and severity. Green-T would reduce severe crashes, but increase rear end crashes with a signal added along TH 169
	Provide safe pedestrian and bicycle travel near and across roadways, to area schools, and to regional destinations.	7	7	7	8	7	NA	NA	NA	NA	NA	NA	Quantitative - number of pedestrian conflict points
GOAL D: Provide infrastructure improvements that respect the environment.*	Avoid, minimize, and mitigate impacts to historic properties.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Will require future detailed analysis
	Avoid, minimize, and mitigate impacts to cultural resources.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Will require future detailed analysis
	Avoid, minimize, and mitigate impacts to the built environment.	0 takes	0 takes	0 takes	0 takes	0 takes	1 partial take	1 total and 1 partial take	3 partial takes	3 total and 4 partial takes	5 partial takes	2 total and 2 partial takes	For 2B1 a total take west of the Hwy 69 intersection is an undeveloped property. For 2c the total takes would impact existing residential properties.
	Avoid, minimize, and mitigate impacts to sensitive environmental resources.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Will require future detailed analysis
	Avoid, minimize, and mitigate impacts to hazardous contaminated areas.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Medium Risk	Medium Risk	Low Risk	Low Risk	Low Risk	To be considered for 2B1 and based on environmental screening there is a hazardous waste area near the Hwy 120 intersection.
	Disproportionate impact to EJ populations	High Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	This is a two pronged analysis with a yes (red cell) or no (green cell) rating. 1) To have an EJ impact, there must first be an impact. In other words, a red cell somewhere else in this table. 2) If there is an impact, we need to determine if it will be "disproportionately high" on EJ communities. Because we have no data to lead us to believe that EJ populations use this area significantly more than other populations (i.e., travel to the corridor or drive through it), there is no reason to assume impacts would be disproportionately high.
	Right-size improvements to address needs yet maximize use of existing infrastructure where possible.												Quantitative - general project footprint, retaining walls, etc.
GOAL E: Develop a financially responsible implementation plan.	Develop fiscally responsible improvements (construction cost)	Baseline	$ 4M	$ 3.2M	$ 5.1M	$ 4.7M	$$$ 22.2M	$$$ 22.6M	$ 5.6M	$ 9M	$ 1.9M	$ 5M	Quantitative - high level project cost in 2023 dollars, contingency, engineering $ = 1-10M, $$ = 10-20M, $$$ = 20M+
	Develop fiscally responsible improvements (Impact (ROW and Env) costs)	Baseline	Low Risk	Low Risk	Low Risk	Low Risk	High Risk	High Risk	Medium Risk	High Risk	Medium Risk	Medium Risk	There is risk associated with the High T at CR 68 and the proximity of the railroad/trail bridge. For 2c the total takes would impact existing residential properties.
	Develop project phases that meet schedule and funding constraints and maximize opportunities.	Baseline											Qualitative - ability to be phased with agency investment plans and agency funding availability
	Develop a supported funding model to clearly identify agency responsibilities.	Baseline											Qualitative - combination of funding competitiveness and agency support
	Position partner agencies to seek federal and state grants for identified improvements to minimize partner costs.	Baseline											Qualitative - Funding competitiveness based on concept ability to reduce/eliminate severe and fatal crashes, improve non-motorized safety and mobility, and gain agency/community support.
GOAL F: Develop a plan supported by all agency partners.	Supported by the PMT	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Quantitative

***Assessment based on planning-level concepts and will require further review to verify actual impacts.**

Weighted Scores

											Weighting Percent Per Goal
Goal A	**24**	**0**	**-6**	**12**	**18**	**36**	**30**	**30**	**24**	**36**	**36**	2
Goal B	**-66**	**0**	**-18**	36	**24**	**72**	**96**	**96**	**48**	**60**	**24**	2
Goal C	**-60**	**0**	**0**	**-15**	**-15**	**30**	**30**	**30**	**30**	**30**	**30**	5
Goal D	**12**	**18**	**18**	**18**	**18**	**16.5**	**15**	**15**	**12**	**16.5**	**12**	0.5
Goal E	**-3**	**16.5**	**16.5**	**16.5**	**16.5**	**0**	**0**	**16.5**	**12**	**15**	**13.5**	0.5
Preliminary Total Score	**-93**	**34.5**	**10.5**	**67.5**	**61.5**	**154.5**	**171**	**187.5**	**126**	**157.5**	**115.5**	

Highway 169 Evaluation

Southern Subarea Grade Separated Ped Crossings

Does Not Meet Measure/ High Risk	-6 pts
Minimally Meets Measure/ Medium Risk	3 pts
Meets Measure/ Low Risk	6 pts

Goals	Objectives	No Build	Separated Ped Crossings		Notes
			A	B	
			Across TH 169 at Hawley Street	Across TH 169 just west of Blue Earth River	
GOAL A: Preserve community connections and economic vitality.	Provide convenient pedestrian and bicycle access to local and regional destinations.	Baseline			Qualitative - The Hawley Street location provides more direct access to the convenient store which is a popular local destination.
GOAL B: Provide efficient and reliable mobility for all users.	Perceived pedestrian/bicyclist level of comfort.				Quantitative - Both options provide complete separation between peds and bikes.
GOAL C: Safely accommodate all system users.	Reduce crash and severity rates.				Quantitative
	Provide safe pedestrian and bicycle travel near and across Highway 169.		0	0	Quantitative - number of vehicle-pedestrian conflict points
GOAL D: Provide infrastructure improvements that respect the environment.*	Avoid, minimize, and mitigate impacts to historic properties.	Low Risk	Low Risk	Low Risk	Quantitative -Will require future detailed analysis.
	Avoid, minimize, and mitigate impacts to cultural resources.	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis.
	Avoid, minimize, and mitigate impacts to the built environment.	0 takes	0 takes	0 takes	Quantitative
	Avoid, minimize, and mitigate impacts to sensitive environmental resources.	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis.
	Avoid, minimize, and mitigate impacts to hazardous contaminated areas.	Low Risk	Low Risk	Low Risk	Quantitative - Will require future detailed analysis.
	Disproportionate impact to EJ populations	High Risk	Low Risk	Low Risk	Quantitative - No Build is high risk given consideration that existing conditions and all proposed concepts do not provide safe pedestrian crossings of Hwy 169.
GOAL E: Develop a financially responsible implementation plan.	Right-size improvements to address needs yet maximize use of existing infrastructure where possible.	Baseline			Quantitative - general project footprint, retaining walls, etc.
	Develop fiscally responsible improvements (construction cost)	Baseline	$$ 5M	$$ 4M	Quantitative - high level project cost in 2023 dollars, contingency, engineering $ = 1-3M, $$ = 3-6M, $$$ = 6M+
	Develop project phases that meet schedule and funding constraints and maximize opportunities.	Baseline			Qualitative - ability to be phased with MnDOT investment plans and agency funding availability
	Develop a supported funding model to clearly identify agency responsibilities.	Baseline			Qualitative - combination of funding competitiveness and agency support
	Position partner agencies to seek federal and state grants for identified improvements to minimize partner costs.	Baseline			Qualitative - Funding competitiveness based on concept anticipated use, ability to reduce/eliminate severe and fatal crashes, improve non-motorized safety and mobility, and gain agency/community support.
GOAL F: Develop a plan supported by all agency partners.	Supported by the PMT	TBD	TBD	TBD	Quantitative

***Assessment based on planning-level concepts and will require further review to verify actual impacts.**

Evaluation Memo Appendix B

TRAFFIC ANALYIS MEMEORANDUM

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Concept Traffic Operations Evaluation

Date: August 25, 2021

To: Charles Androsky, Transportation Planner, MAPO

From: Scott McBride, PE, Project Manager, Bolton & Menk, Inc.

Kelsey Retherford, PE, Traffic Engineer, Bolton & Menk, Inc.

Subject: Concept Traffic Operations Evaluation

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO)

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Real People. Real Solutions.

Introduction

The Mankato/North Mankato Area Planning Organization (MAPO) in collaboration with the Cities of North Mankato, Mankato, Blue Earth County, Nicollet County, and the Minnesota Department of Transportation (MnDOT) are working to identify transportation improvements on Highway 169. This report summarizes the future traffic analysis of Highway 169 in the Northern Subarea from Lake St to the Veterans' Memorial Bridge and in the southern subarea from the Blue Earth River Crossing to Highway 60.

Northern Subarea

The northern subarea extends from Lake St to the Veterans' Memorial Bridge. This segment is a four-lane divided expressway withing the Cities of Mankato and North Mankato. This subarea has a large concentration of commercial, heavy industrial, light industrial, residential, and public/institutional land uses served by Lind St and Webster Ave connections to Highway 169.

Concepts

Throughout the northern subarea four overall options were derived with several sub options to analyze various traffic control. These options are described below:

- **Concept 1 – Spot Intersection Improvements**
  - Signalized Green-T at EB TH 14 Exit Ramp
  - Local system concepts
    - Range St remain Full Access (no change from existing)
    - Range St Cul-de-sac
    - Range St Right-In/Right-Out
    - Range St Modernization
- **Concept 2 – Access Relocation (Combine Lind St/River Ln)**
  - Signals at combined Lind St/River Ln and Webster Ave intersections
  - Roundabouts at combined Lind St/River Ln and Webster Ave intersections
  - Signalized RCUTs at combined Lind St/River Ln and Webster Ave intersections
- **Concept 3 – Combined Intersection (Lind St/River Ln/Webster Ave)**
  - At grade signal at combined Lind St/River Ln/Webster Ave intersection
  - Interchange at combined Lind St/River Ln/Webster Ave intersection
- **Concept 4 – TH 14 Interchange Improvements**
  - Full cloverleaf interchange
  - Eliminate South Loop
    - Roundabout at EB TH 14 Ramps
    - Signal at EB TH 14 Ramps
  - Eliminate Both Loops
    - Diverging Diamond
    - Roundabouts
  - Signalize EB TH 14 exit ramp at TH 169

Traffic Operations

A level of service (LOS) analysis of the 2040 peak hours was completed using the forecasted turning movement counts in Synchro/SimTraffic for the signalized/stop-controlled intersections and in Vissim for roundabouts. Traffic operations were not analyzed for the local system concepts at Range St. This is because traffic volumes were not collected at this intersection and it is outside the project limits. The four local system concepts were derived to show a full range of options at the intersection of Range St and Webster Ave as traffic queuing from the TH 169 and Webster Ave intersection extends beyond Range St during the peak hours. The operations for the Northern Subarea concepts analyzed are shown in **Tables 1** through **4** below.

Table 1. Concept 1 – 2040 Build Traffic Operations

Intersection	Traffic Control	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
EB TH 14 Exit Ramp at TH 169	Signalized Green T	12	B	EBL	45	D	300	9	A	EBL	49	D	300

*Delay in seconds per vehicle.

Table 1 shows the traffic operations with a signalized Green-T at the intersection of TH 169 and EB TH 14 exit ramp. This shows that the concept would operate well with the overall peak hours operating with LOS A or B and all movements operating with LOS D or better. However, the preliminary concept design of this concept showed that the northbound left turn lane for the WB TH 14 entrance ramp is located too close to the TH 169 at EB TH 14 exit ramp intersection. Specifically, the crossover between the eastbound left traffic from the EB TH 14 exit ramp and the northbound left traffic at the WB TH 14 entrance ramp is a crash concern and therefore this concept was dismissed from further evaluation. The detailed 2040 traffic operations are included in **Tables A1** and **A2** of **Appendix A** and a concept drawing of the concept is included in **Appendix B**.

Table 2. Concept 2 – 2040 Build Traffic Operations

Intersection	Traffic Control	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
Lind St/River Ln at TH 169	Signal	33	C	SBL	75	E	400	32	C	SBL	96	F	450
Webster Ave at TH 169		28	C	SBL	72	E	50	30	C	SBL	79	E	125
Lind St/River Ln at TH 169	Roundabout**	7	A	EBT	68	F	250	8	A	EBT	59	F	200
Webster Ave at TH 169		11	B	WBL	68	F	200	10	B	WBL/T	52	F	225
Lind St/River Ln NB U-Turn at TH 169	Signalized RCUTs	4	A	NBU	33	C	125	4	A	NBU	32	C	175
Lind St/River Ln at TH 169		17	B	NBL	47	D	50	30	C	SBL	76	E	500
Lind St/River Ln SB U-Turn at TH 169		5	A	SBU	73	E	200	4	A	SBU	63	E	150
Webster Ave NB U-Turn at TH 169		4	A	NBU	72	E	125	4	A	NBU	74	E	175
Webster Ave at TH 169		12	B	NBL	49	D	150	17	B	NBL	44	D	175
Webster Ave SB U-Turn at TH 169		10	B	SBU	39	D	300	7	A	SBU	27	C	300

*Delay in seconds per vehicle.
**Operational Analysis from Vissim

Table 2 shows the traffic operations with signals, roundabouts, and signalized RCUTs at the combined Lind St/River Ln intersection with TH 169 and the intersection of Webster Ave at TH 169. This shows that each concept is anticipated to operate with LOS C or better for the intersection overall during both peak hours. The roundabouts operate with the lowest intersection delay of the three traffic control concepts analyzed. The maximum movement delay is also lowest with the roundabouts, however, the LOS indicates some movements are anticipated to operate with LOS F. This is because the delay thresholds associated with LOS for a roundabout are based on a stop controlled intersection which have lower delay thresholds than a signalized

intersection. The signalized RCUTs analysis shows that all movements are anticipated to operate with LOS E or better. The signal analysis shows that the SBL during the AM peak at the combined Lind St/River Ln intersection is anticipated to operate with LOS F, but all other movements operate with LOS E or better. The detailed 2040 traffic operations are included in **Tables A3** through **A8** of **Appendix A** and concept drawings of the concepts which show lane configuration assumptions with each concept are included in **Appendix B**.

Table 3. Concept 3 – 2040 Build Traffic Operations

Intersection	Traffic Control	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
Signalized At Grade Intersection													
Lind St/River Ln/Webster Ave at TH 169	Signal	41	D	EBL	96	F	325	45	D	WBL	90	F	275
Interchange													
SB TH 169 Ramps	Roundabout	6	A	EBT	8	A	175	11	B	SBL/SBR	17	B	325
NB TH 169 Ramps		18	C	WBR	27	D	500	10	B	WBT	18	C	350

*Delay in seconds per vehicle.

Table 3 shows the traffic operations with an at grade signal or grade separated interchange at a combined Lind St/River Ln/Webster Ave intersection with TH 169. This shows that a signal would operate with LOS D overall, however, the maximum delay movement would operate with LOS F during both peak hours. All other movements are anticipated to operate with LOS E or better. This concept was analyzed with channelized left and right turn lanes on the northbound, southbound, and westbound approaches. A dual left turn lane and channelized right turn lane was assumed for the eastbound approach. This concept was not drawn as it was dismissed by the Project Management Team (PMT) due to concerns with the concept being too impactful to existing businesses and future redevelopment areas. The interchange option was assumed to have single lane roundabouts at the ramp terminals. This option operates well with all movements operating with LOS D or better during both peak hours. The detailed 2040 traffic operations are included in **Tables A9a** through **A10b** of **Appendix A.**

Table 4. Concept 4 – 2040 Build Traffic Operations

Intersection	Traffic Control	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
Full Cloverleaf Interchange													
TH 14 at TH 169		1	A	SBR	6	A	25	2	A	SBR	6	A	25
Eliminate South Loop													
EB TH 14 Ramps at TH 169	Roundabout**	63	F	EBR	435	F	4900	45	E	EBR	444	F	3225
EB TH 14 Ramps at TH 169	Signal	19	B	SBL	60	E	250	22	C	SBL	61	E	275
Eliminate Both Loops													
TH 14 at TH 169	Signal (Diverging Diamond)	5**	A	EBL/WBL	16	B	175/200	6**	A	WBL	17	B	225
WB TH 14 Ramps at TH 169	Roundabout***	17	C	SBR/WBL	25	D	475/425	78	F	WBR	273	F	1650
EB TH 14 Ramps at TH 169	Roundabout***	22	C	EBR	123	F	1900	10	A	EBR	52	F	450
Signalize EB TH 14 Exit Ramp													
EB TH 14 Ramps at TH 169	Signal	12	B	EBL	46	D	250	9	A	EBL	48	D	250

*Delay in seconds per vehicle.
**Overall Interchange Delay (average delay of all movements at the interchange)
***Operational Analysis from Vissim

Table 4 shows the traffic operations for the TH 14 interchange improvement concepts. **Table 4** shows how a full cloverleaf interchange would operation with the lowest amount of delay and all movements operate with LOS A during both peak hours. **Table 4** also shows how eliminating the south loop and making the EB TH 14

ramp at TH 169 intersection a roundabout operates with excessive delay and queuing. The eastbound exit ramp is approximately 1650 ft in length so the maximum queues are anticipated to extend onto mainline TH 14 with a roundabout. With a signal at this intersection the overall delay is LOS B or C during the peak hours. The maximum movement delay with a signal is LOS E and queuing is anticipated to be minimal. **Table 4** shows how roundabouts or a diverging diamond will operate with both loops eliminated. This indicates that roundabouts at both ramp terminals will operate with excessive delay and queuing. The diverging diamond, however, operates well with an average delay of only 5-6 seconds per vehicle during both peak hours and the maximum movement delay operates with LOS B during both peak hours. Finally, **Table 4** shows how signalizing the EB TH 14 exit ramp would operate with minimal delay for the intersection overall and would reduce the eastbound left at the exit ramp from LOS F under the no build scenario to LOS D during both peak hours. The detailed 2040 traffic operations are included in **Tables A11** through **A18** of **Appendix A** and concept drawings of the concepts are included in **Appendix B**.

Additional Traffic Analysis

Vissim Analysis

An additional operational analysis was completed in Vissim to confirm that a signal at the TH 14 interchange would operate acceptably with roundabouts at Lind St/River Ln and Webster Ave. The operations are summarized in **Table 5** below.

Table 5. Additional Vissim Analysis – 2040 Build Traffic Operations

Intersection	Traffic Control	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
EB TH 14 Exit Ramp at TH 169	Signal	18	B	SBL	66	E	350	17	B	SBL	62	E	325
Lind St/River Ln at TH 169	Roundabout	8	A	EBL	45	E	225	9	A	EBT	41	E	175
Webster Ave at TH 169		10	B	WBL	67	F	200	10	B	WBL	42	E	200

Table 5 indicates that a signal at the TH 14 exit ramp and TH 169 intersection is anticipated to operate acceptably with roundabouts at Lind St/River Ln and Webster Ave. In fact, the traffic operations indicate that a signal at TH 14 actually reduces the delay for the eastbound approach at Lind St/River Ln as the signal creates gaps in the southbound TH 169 mainline traffic instead of SB TH 169 being a free-flowing movement like it is today. The detailed 2040 traffic operations are included in **Tables A19** and **A20** of **Appendix A.**

Sensitivity Analysis

A sensitivity analysis was completed for the eastbound TH 14 exit ramp to see how operations are anticipated to worsen over time as volumes increase. The results are shown in **Table 6**.

Table 6. EB TH 14 Exit Ramp at TH 169 - Traffic Operations

Year	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)								Queue Lengths (ft)				Volumes		
				NBT		SBT		EBL		EBR		EBL		EBR		EBL	EBR	SBT
												Avg	Max	Avg	Max			
2020	AM	5	A	0	A	1	A	31	D	11	B	100	175	75	175	158	250	818
	PM	7	A	0	A	1	A	81	F	11	B	125	275	75	225	150	163	1068
2025	AM	8	A	1	A	1	A	61	F	13	B	125	325	100	300	168	272	863
	PM	12	B	0	A	1	A	143	F	27	D	175	400	150	625	158	175	1128
2030	AM	10	B	0	A	1	A	82	F	14	B	150	350	100	205	178	294	908
	PM	18	C	1	A	1	A	214	F	39	E	250	450	250	800	165	187	1188
2035	AM	29	D	0	A	1	A	239	F	47	E	300	450	375	925	187	315	953
	PM	50	F	1	A	1	A	502	F	219	F	375	475	800	1800	173	199	1248
2040	AM	25	D	0	A	1	A	204	F	39	E	300	475	275	800	196	336	998
	PM	87	F	1	A	1	A	926	F	538	F	450	475	1475	2025	180	210	1308

1. Delay in seconds per vehicle

This shows how the existing (2020) peak hour shows failing operations for the eastbound left turn during the PM peak hour and by 2025 both peak hours show failing LOS for the eastbound left turn. It should be noted that video footage of the intersection could not be obtained to verify the existing condition due to non-normal traffic patterns because of COVID-19 so it is unclear if this delay is experienced by drivers today. Traffic volumes should be monitored to determine when a signal is needed to mitigate the delay for the eastbound left turn.

Travel Time Analysis

A travel time analysis was completed during the 2040 AM and PM peak hours along northbound and southbound TH 169 to see how each option increases or decreases the travel time for mainline vehicles compared to the No Build scenario. The travel time was reported along the northern subarea between Lake St NW and Belgrade Ave for each concept. Each option was modeled only changing described improvement. All other intersections along the corridor were kept as the existing condition. **Table 7** shows the travel time for the 2040 No Build scenario and each of the northern subarea concepts. **Table 8** shows the change in travel time compared to the No Build scenario with the last row in **Table 8** showing the average change in travel time for both peak hours and both directions of travel.

Table 7. Travel Time from Lake St NW to Belgrade Ave

Peak Hour	Direction	No Build	Highway 169 Concepts								
			1a	1b	1c	1d & 2a	2b	2c	2d	2e	2f
			Combined River Ln / Lind St Signals	Combined River Ln / Lind St Roundabouts	Combined River Ln / Lind St RCUTs	TH 14 Interchange Full Cloverleaf and Webster Area Interchange	TH 14 Interchange Eliminate South Loop - Roundabout	TH 14 Interchange Eliminate South Loop - Signal	TH 14 Interchange Diverging Diamond	TH 14 Interchange Roundabout Ramp Intersections	TH 14 Interchange Signalize EB TH 14 Exit Ramp
AM	Northbound	220	223	180	217	151	254	234	248	265	222
	Southbound	212	253	230	196	187	216	252	229	305	220
PM	Northbound	234	223	185	254	153	274	251	258	285	234
	Southbound	214	239	228	249	188	219	239	230	330	220

Table 8. Change In Travel Time Compared to No Build from Lake St NW to Belgrade Ave

Peak Hour	Direction	No Build	Highway 169 Concepts								
			1a	1b	1c	1d & 2a	2b	2c	2d	2e	2f
			Combined River Ln / Lind St Signals	Combined River Ln / Lind St Roundabouts	Combined River Ln / Lind St RCUTs	TH 14 Interchange Full Cloverleaf and Webster Area Interchange	TH 14 Interchange Eliminate South Loop - Roundabout	TH 14 Interchange Eliminate South Loop - Signal	TH 14 Interchange Diverging Diamond	TH 14 Interchange Roundabout Ramp Intersections	TH 14 Interchange Signalize EB TH 14 Exit Ramp
AM	Northbound	Baseline	3	-40	-3	-69	34	14	28	45	2
	Southbound		41	18	-16	-25	5	40	18	93	8
PM	Northbound		-12	-49	20	-81	40	17	24	51	0
	Southbound		25	14	35	-26	5	25	16	116	6
Average Change in Travel Time		*Baseline*	*15*	*-14*	*9*	*-50*	*21*	*24*	*22*	*76*	*4*

The information shown in **Tables 7** and **8** indicate that Concepts 1a, 1c, 2b, 2c, 2d and 2f would minimally increase the average travel time for vehicles from the No Build scenario with the average travel time increasing by between 4 and 24 seconds. Concepts 1b and 1d/2a shows a decrease in travel time on average compared to the No Build scenario. For Concept 1b the northbound travel time shows an estimated 40 to 49 second reduction during the peak hours and the southbound travel time shows an estimated increase of only 14 to 18 seconds. For Concept 1d/2a the northbound travel time shows an estimated 25 to 26 second reduction and the southbound travel time shows an estimated 69 to 81 seconds reduction during the peak hours. Concept 2e, which analyzed roundabouts at the TH 14 ramp terminals shows the greatest increase in travel time with

an average increase in travel time of 76 seconds. The northbound travel time shows an estimated increase in travel time by 45 to 51 second during the peak hours and the southbound travel time shows an estimated increase of 93 to 116 seconds.

Southern Subarea

The southern subarea runs from the Blue Earth River crossing to Highway 60 within South Bend Township. This is a four-lane divided expressway corridor. This area includes primarily low density residential, park, and open space land uses directly adjacent to Highway 169, with some areas of commercial and light industrial.

The southern subarea was broken down into three sections for the concept analysis. These sections are outlined below:

- Section 1 extends from the Blue Earth River crossing to CSAH 33
- Section 2 extends from CSAH 33 to CSAH 90
- Section 3 extends from CSAH 90 to 208th Ln

Concepts

Throughout the southern subarea options were derived for each section. These options are described below:

- **Section 1 – Blue Earth River crossing through CSAH 33**
    - Concept 1A – RCUTs at Amos Owen Ln and CSAH 33
    - Concept 1B – Restrict access at Hawley St; RCUTs at Amos Owen Ln and CSAH 33
    - Concept 1C – Signalized Green T at Hawley St; restrict access at CSAH 33 and Amos Owen Ln
    - Concept 1D – Signalized Green T at CSAH 33; restrict access at Hawley St and Amos Owen Ln

- **Section 2 – CSAH 33 to CSAH 90**
    - Concept 2A – High-T at TH 68; restrict access at CR 120, CSAH 69, and businesses; close Bison St access
    - Concept 2B1 – High-T at TH 68; consolidate access near CSAH 69 to provide better access spacing; close Bison St access
    - Concept 2B2 – Right-In/Right-Out at TH 68; consolidate access between CR 120 and CSAH 69 to provide better access spacing; close Bison St access
    - Concept 2C – RCUTs at CR 120 and CSAH 69; add south leg to TH 68; close Bison St access
- **Section 3 – CSAH 90 to 208th Ln**
    - Concept 3A – RCUT at Gadwall Rd; restrict access at TH 60; close access at 208th Ln and Loren Dr
    - Concept 3B – Realign Gadwall Rd to provide better access spacing; close access at 208th Ln, Loren Dr, and CR 117

Traffic Operations

A level of service (LOS) analysis of the 2040 peak hours was completed using the forecasted turning movement counts in Synchro/SimTraffic. Detailed traffic operations were not completed for Concept 2B1, 2C, or 3B as these concepts were kept at higher level and are anticipated to operate similar to either the other concepts analyzed or the existing conditions. The operations for the Southern Subarea concepts analyzed are shown in **Tables 9** through **11** below.

Table 9. Section 1 Concepts – 2040 Build Traffic Operations

Concept	Intersection	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
1A	CSAH 69 (Hawley St) at TH 169	26	D	WBL	189	F	1675	3	A	WBL	32	D	75
	CSAH 33 at TH 169	5	A	WBL	33	D	300	10	B	WBL	119	F	450
	CSAH 33 at TH 169 EB U-Turn	2	A	EBY	26	D	50	3	A	EBU	21	C	75
1B (All WBL's from Hawley use U-Turn)	CSAH 69 (Hawley St) at TH 169	4	A	EBR	6	A	0	2	A	EBR	3	A	0
	CSAH 33 at TH 169	6	A	WBL	44	E	350	16	C	WBL	214	F	650
	CSAH 33 at TH 169 EB U-Turn	3	A	EBU	34	D	75	4	A	EBU	24	C	75
	CSAH 33 at TH 169 WB U-Turn	8	A	WBU	77	F	600	4	A	WBU	247	F	125
1B (Half WBL's from Hawley use U-Turn, Half use CSAH 33)	CSAH 69 (Hawley St) at TH 169	3	A	EBR	4	A	0	2	A	EBR	3	A	0
	CSAH 33 at TH 169	25	D	WBL	181	F	875	21	C	WBL	286	F	700
	CSAH 33 at TH 169 EB U-Turn	5	A	EBU	75	F	75	5	A	EBU	58	F	125
	CSAH 33 at TH 169 WB U-Turn	3	A	WBU	19	C	175	3	A	WBU	250	F	100
1C (WBL allowed at CSAH 33)	CSAH 69 (Hawley St) at TH 169	8	A	NBL	28	C	50	6	A	WBL	31	C	75
	CSAH 33 at TH 169	6	A	WBL	44	E	375	36	E	WBL	444	F	1000
1C (All WBLs at Green-T)	CSAH 69 (Hawley St) at TH 169	16	B	NBL	36	D	50	11	B	WBL	34	C	250
	CSAH 33 at TH 169	2	A	EBT	3	A	0	4	A	EBT	6	A	0
1D (All WBLs at Green-T)	CSAH 69 (Hawley St) at TH 169	2	A	EBR	5	A	0	4	A	EBR	7	A	0
	CSAH 33 at TH 169	21	C	WBL	43	D	550	15	B	WBL	44	D	275

*Delay in seconds per vehicle.

Table 9 shows the traffic operations for the Section 1 concepts. The Concept 1A operations indicate that the westbound left turn at Hawley St during the AM peak hour and at CSAH 33 during the PM peak hour operates with failing LOS (2-3 minutes of delay on average per vehicle). Additionally, the traffic queues for the westbound left at Hawley St during the AM peak hour are anticipated to extend 1675 ft. The channelized turn lane is only 350 ft so vehicles would block one of the through lanes along TH 169 with this option.

Concept 1B was analyzed two different ways. Concept 1B eliminates the westbound left turning movement at the intersection of Hawley St and TH 169 so the operations were analyzed first assuming all of the westbound lefts re-route via the U- turn along TH 169. Next Concept 1B was also analyzed assuming half of the westbound lefts re-route via the U- turn along TH 169 and the other half make the westbound left turn at CSAH 33. The operations for both options indicate that the westbound left and westbound U-turn are anticipated to operate with failing LOS and several longer queues during both peak hours.

Concept 1C was also analyzed two different ways. This concept proposes a signalized Green-T at Hawley St and eliminates the northbound left movement from CSAH 33 but keeps the westbound left turn at CSAH 33 open. The traffic operations indicate that if left open the westbound left at CSAH 33 would operate with failing LOS (over 7 minutes of delay per vehicle). Therefore, traffic operates were analyzed with CSAH 33 restricted to a right-in/right-out and all westbound left turners were re-routed via Hawley St. With all westbound lefts at Hawley St the operations are acceptable during both peak hours with the maximum movement delay of LOS D during the AM peak, LOS C during the PM peak, and minimal traffic queuing.

Concept 1D is similar to 1C, but proposes a signalized Green-T at CSAH 33 instead of Hawley St. With all westbound lefts assumed to occur at the CSAH 33 Green-T and Hawley St assumed to be restricted to right-in/right-out operations were found to be acceptable. The detailed 2040 traffic operations are included in **Tables A21** through **A32** of **Appendix C** and concept drawings of the concepts are included in **Appendix D**.

Table 10. Section 2 Concepts – 2040 Build Traffic Operations

Concept	Intersection	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
2A	TH 68 at TH 169	3	A	SBL	6	A	100	2	A	SBL	5	A	100
2B2 (Stop Controlled)	TH 68 at TH 169	2	A	SBR	7	A	75	3	A	SBR	7	A	50
	CSAH 69 at TH 169	40	E	SBL	351	F	1025	106	F	SBL	1115	F	2075
2B2 (Stop Controlled, Acceleration Lane)	TH 68 at TH 169	3	A	SBR	10	B	75	2	A	SBR	7	A	50
	CSAH 69 at TH 169	11	B	SBL	82	F	400	15	C	SBL	145	F	575
2B2 (Signalized)	TH 68 at TH 169	3	A	SBR	6	A	75	4	A	EBT	7	A	0
	CSAH 69 at TH 169	11	B	SBL	47	D	300	11	B	SBL	47	D	275

*Delay in seconds per vehicle.

Table 10 shows the traffic operations for the Section 2 Concepts. The operations for Concept 2A indicates that the High-T at the intersection of TH 68 and TH 169 operates well as a stop-controlled intersection with all movements operating with LOS A during both peak hours. Concept 2B2 analyzed the TH 68 at TH 169 intersection as a right-in/right-out and full access at the CSAH 69 and TH 169 intersection. Multiple traffic control options were analyzed for the intersection of CSAH 69 at TH 169. **Table 10** indicates that with stop control and no acceleration lanes the southbound left operates with excessive delay causing the peak hour overall to operate with LOS E during the AM peak hour and LOS F during the PM peak hour. An acceleration lane for the southbound left movement was also analyzed with stop control at the intersection of CSAH 69 and TH 169, however delay was still shown to be excessive for the southbound left turning movement. With a signal at CSAH 69 and TH 169 the operations are acceptable.

Although Concepts 2B1 and 2C were not modeled these options are anticipated to operate similar to Concepts 2A and 2B2. Concept 2B1 shows a High T at TH 68 and TH 169 which would operate similar to Concept 2A. Concept 2B1 also shows a full access intersection at CSAH 69 and TH 169 which would operate similar to Concept 2B2. Concept 2C shows a full access intersection at TH 68 and right-in/right-out at CSAH 69 which would operate similar to Concept 2B2.

The detailed 2040 traffic operations are included in **Tables A33** through **A40** of **Appendix C** and concept drawings of the concepts are included in **Appendix D**.

Table 11. Section 3 Concepts – 2040 Build Traffic Operations													
Concept	Intersection	A.M. Peak Hour						P.M. Peak Hour					
		Intersection		Maximum Movement				Intersection		Maximum Movement			
		Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)	Delay*	LOS	Mvmt	Delay*	LOS	Queue (ft)
3A	TH 60 at TH 169	5	A	WBL	11	B	150	8	A	WBL	68	F	375
	EB TH 169 U-Turn E of TH 60	5	A	EBU	12	B	50	4	A	EBU	23	C	75

*Delay in seconds per vehicle.

Table 11 shows the traffic operations for Section 3 with an RCUT at Gadwall Rd and restricted access at TH 60 (no northbound left turn). This indicates that the intersections overall operate well with LOS A during both peak hours. The westbound left turn at TH 60 operates with LOS F during the PM peak hour, but delay is minimal during the AM peak hour. Although Concept 3B was not modeled, this option keeps TH 60 at TH 169 full access. If left as a full access intersection the northbound left turn is anticipated to operate with excessive delay during the PM peak hour as shown in the 2040 No Build operations.

The detailed 2040 traffic operations are included in **Tables A41** and **A42** of **Appendix C** and concept drawings of the concepts are included in **Appendix D**.

Travel Time Analysis

A travel time analysis was also completed for the southern subarea concepts during the 2040 AM and PM peak hours along northbound and southbound TH 169 to see how each option increases or decreases the travel time for mainline vehicles compared to the No Build scenario. The travel time was reported along the southern subarea by section. The section 1 travel time was compared from Hawley St to CSAH 33, section 2 travel time was compared from CSAH 33 to CSAH 90, and section 3 travel time was compared from CSAH 90 to TH 60.

Table 12 shows the travel time for the 2040 No Build scenario and each of the southern subarea options in section 1. **Table 13** shows the change in travel time compared to the No Build scenario.

Table 12. Travel Time from Hawley St to CSAH 33						
Peak Hour	Direction	No Build - Section 1	Highway 169 Concepts			
			1a	1b	1c	1d
			RCUTs at Amos Owen Ln and CSAH 33	Restrict access at Hawley St; RCUTs at Amos Owen Ln and CSAH 33	Signalized Green T at Hawley St; restrict access at CSAH 33 and Amos Owen Ln	Signalized Green T at CSAH 33; restrict access at Hawley St and Amos Owen Ln
AM	Northbound	64	64	73	86	106
	Southbound	78	71	86	58	59
PM	Northbound	65	70	70	103	103
	Southbound	62	88	73	95	91

Table 13. Change In Travel Time Compared to No Build from Hawley St to CSAH 33						
Peak Hour	Direction	No Build - Section 1	Highway 169 Concepts			
			1a	1b	1c	1d
			RCUTs at Amos Owen Ln and CSAH 33	Restrict access at Hawley St; RCUTs at Amos Owen Ln and CSAH 33	Signalized Green T at Hawley St; restrict access at CSAH 33 and Amos Owen Ln	Signalized Green T at CSAH 33; restrict access at Hawley St and Amos Owen Ln
AM	Northbound	Baseline	0	9	22	42
	Southbound		-8	8	-20	-19
PM	Northbound		5	5	38	38
	Southbound		25	10	32	29
Average Change in Travel Time		*Baseline*	6	8	18	22

The information shown in **Tables 12** and **13** indicate that all of the concepts analyzed in section 1 of the southern subarea would minimally increase the average travel time for vehicles from the No Build scenario with the average travel time increasing by between 6 and 22 seconds.

Table 14 shows the travel time for the 2040 No Build scenario and each of the southern subarea options in section 2. **Table 15** shows the change in travel time compared to the No Build scenario.

Table 14. Travel Time from CSAH 33 to CSAH 90

Peak Hour	Direction	No Build - Section 2	Highway 169 Concepts			
			2a	2b1	2b2	2c
			High-T at TH 68; restrict access at CR 120, CSAH 69, and businesses; close Bison St access	High-T at TH 68; consolidate access near CSAH 69; close Bison St access	RIRO at TH 68; consolidate access between CR 120 and CSAH 69; close Bison St access	RCUTs at CR 120 and CSAH 69; add south leg to TH 68; close Bison St access
AM	Northbound	100	97	N/A - did not model this concept	105	N/A - did not model this concept
	Southbound	107	103		116	
PM	Northbound	106	97		114	
	Southbound	114	104		122	

Table 15. Change In Travel Time Compared to No Build from CSAH 33 to CSAH 90

Peak Hour	Direction	No Build - Section 2	Highway 169 Concepts			
			2a	2b1	2b2	2c
			High-T at TH 68; restrict access at CR 120, CSAH 69, and businesses; close Bison St access	High-T at TH 68; consolidate access near CSAH 69; close Bison St access	RIRO at TH 68; consolidate access between CR 120 and CSAH 69; close Bison St access	RCUTs at CR 120 and CSAH 69; add south leg to TH 68; close Bison St access
AM	Northbound	Baseline	-3	N/A - did not model this concept	5	N/A - did not model this concept
	Southbound		-4		9	
PM	Northbound		-9		8	
	Southbound		-10		8	
Average Change in Travel Time		*Baseline*	-7	*N/A - did not model this concept*	7	*N/A - did not model this concept*

The information shown in **Tables 14** and **15** indicate that Concept 2a is anticipated to decrease the travel time and Concept 2b2 is anticipated to minimally increase the travel time compared to the 2040 No Build scenario. Concept 2b1 and 2c were not modeled, however, due to the similarities in design to those modeled they are also estimated to minimally change the travel time from the 2040 No Build scenario.

Table 16 shows the travel time for the 2040 No Build scenario and the southern subarea options in section 3. **Table 17** shows the change in travel time compared to the No Build scenario.

Table 16. Travel Time from CSAH 33 to CSAH 90				
Peak Hour	Direction	No Build - Section 3	Local System Concepts	
			3a	3b
			RCUT at Gadwall Rd; restrict access at TH 60; close access at 208th Ln and Loren Dr	Realign Gadwall Rd; close access at 208th Ln, Loren Dr, and CR 117
AM	Northbound	121	155	N/A - did not model this concept
	Southbound	121	153	
PM	Northbound	127	111	
	Southbound	115	110	

Table 17. Change In Travel Time Compared to No Build				
Peak Hour	Direction	No Build - Section 3	Local System Concepts	
			3a	3b
			RCUT at Gadwall Rd; restrict access at TH 60; close access at 208th Ln and Loren Dr	Realign Gadwall Rd; close access at 208th Ln, Loren Dr, and CR 117
AM	Northbound	Baseline	34	N/A - did not model this concept
	Southbound		31	
PM	Northbound		-16	
	Southbound		-5	
Average Change in Travel Time		*Baseline*	11	*N/A - did not model this concept*

Tables 16 and **17** indicate that Concept 3a is anticipated to minimally increase the travel time compared to the 2040 No Build scenario. Concept 3b was not modeled, however, it is anticipated to operate similarly to Concept 3a assuming mainline TH 169 has the priority at each intersection.

Conclusion

This report summarizes the alterative traffic analysis of Highway 169 in the Northern Subarea from Lake St to the Veterans' Memorial Bridge and in the southern subarea from the Blue Earth River Crossing to Highway 60. Several concept designs were analyzed in both subareas. The concepts that operate acceptably are detailed below.

Northern Subarea

- Signals, roundabouts, or signalized RCUTs at a combined Lind St/River Ln and Webster Ave intersections were found to operate well.
- An interchange near Webster Ave that would combine Lind St, River Ln, and Webster Ave was found to operate well.
- At the TH 14/TH 169 interchange both a signalized intersection at the EB TH 14 ramps or a diverging diamond interchange were found to operate well.

Southern Subarea

- In Section 1 a signalized Green-T was found to operate well at either Hawley St or CSAH 33.
- In Section 2 both a High-T or a right-in/right-out were found to operate well at the TH 68 and TH 169 intersection.
- In Section 2 a full access intersection operates well if signalized.

- In Section 3 an RCUT at Gadwall Rd and restricting access at TH 60 was found to operate well.

The travel time analysis indicated that all concepts in the northern subarea except Concept 2e are anticipated to minimally change the travel time compared to the 2040 No Build scenario. In the southern subarea, all concepts were shown to have a minimal impact on travel time compared to the 2040 No Build scenario.

Concept Evaluation Traffic Operations Memo
Appendix A:
Northern Subarea Detailed Traffic Operations

MAPO
MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION

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Table A1: Northern Subarea - Concept 1 - Signalized Green-T - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)							
				NBT		SBT		EBL		EBR	
Hwy 169 & EB TH 14 Exit	AM	12	B	0	A	9	A	45	D	23	C
Signalized Intersection	PM	9	A	1	A	7	A	49	D	26	C

1. Delay in seconds per vehicle

Table A2: Northern Subarea - Concept 1 - Signalized Green-T - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)							
		EBL		EBR		NBT		SBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & EB TH 14 Exit	AM	150	300	150	325	-	-	125	325
Signalized Intersection	PM	150	300	100	275	-	-	150	325

Table A3: Northern Subarea - Concept 2 - Access Relocation (Combined River Ln/Lind St) - Signalized Intersections - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																					
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
Hwy 169 & Lind St/River Ln	AM	33	C	39	D	30	C	18	B	75	E	29	C	7	A	43	D	43	D	14	B	50	D	63	E	52	D
Signalized Intersection	PM	32	C	56	E	25	C	15	B	96	F	23	C	7	A	50	D	52	D	18	B	66	E	57	E	62	E
Hwy 169 & Webster Ave	AM	28	C	61	E	19	B	6	A	72	E	30	C	19	B	49	D	50	D	21	C	36	D	37	D	12	B
Signalized Intersection	PM	30	C	75	E	22	C	6	A	79	E	27	C	19	B	55	E	67	E	27	C	38	D	36	D	16	B

1. Delay in seconds per vehicle

Table A4: Northern Subarea - Concept 2 - Access Relocation (Combined River Ln/Lind St) - Signalized Intersections - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																							
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & Lind St/River Ln	AM	75	175	75	175	25	75	200	575	200	575	200	325	25	50	250	725	75	400	150	400	300	550	25	325
Signalized Intersection	PM	75	175	75	175	25	75	225	700	225	700	225	325	25	100	225	500	50	200	200	450	250	525	25	225
Hwy 169 & Webster Ave	AM	250	525	250	525	75	175	25	100	25	100	25	75	100	175	200	475	25	125	25	50	175	500	75	350
Signalized Intersection	PM	275	550	275	550	100	175	50	175	50	175	25	100	125	250	250	425	25	50	50	125	200	425	75	250

Table A5: Northern Subarea - Concept 2 - Access Relocation (Combined River Ln/Lind St) - Roundabouts - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																							
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
Hwy 169 & Lind St/River Ln	AM	7	A	7	A	6	A	6	A	7	A	5	A	5	A	67	F	68	F	46	E	13	B	16	C	2	A
Roundabout	PM	8	A	9	A	8	A	8	A	10	B	6	A	6	A	56	F	59	F	37	E	19	C	14	B	2	A
Hwy 169 & Webster Ave	AM	11	B	16	C	11	B	11	B	5	A	4	A	5	A	34	D	6	A	16	C	68	F	40	E	41	E
Roundabout	PM	10	B	11	B	7	A	6	A	6	A	5	A	5	A	29	D	46	E	16	C	52	F	52	F	39	E

1. Delay in seconds per vehicle

Table A6: Northern Subarea - Concept 2 - Access Relocation (Combined River Ln/Lind St) - Roundabouts - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																							
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & Lind St/River Ln	AM	50	250	50	250	50	250	25	100	25	100	0	0	25	325	25	325	25	325	25	250	25	250	25	250
Roundabout	PM	50	200	50	200	50	200	25	150	25	150	0	0	50	400	50	400	50	400	25	350	25	350	25	350
Hwy 169 & Webster Ave	AM	100	500	100	500	100	500	25	200	25	200	25	200	50	400	50	400	50	400	25	225	25	225	25	225
Roundabout	PM	100	600	100	600	100	600	25	225	25	225	25	225	50	350	50	350	50	350	25	275	25	275	25	275

Table A7: Northern Subarea - Concept 2 - Access Relocation (Combined River Ln/Lind St) - Signalized RCUTs - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																			
				NBU		NBL		NBT		NBR		SBU		SBL		SBT		SBR		EBR		WBR	
Hwy 169 & Lind St/River Ln	AM	17	B	-		47	D	19	B	8	A	-		45	D	9	A	3	A	16	B	35	D
Signalized Intersection	PM	30	C	-		61	E	28	C	10	B	-		76	E	21	C	6	A	22	C	67	E
Hwy 169 & Webster Ave	AM	12	B	-		49	D	10	B	5	A	-		45	D	7	A	5	A	27	C	16	B
Signalized Intersection	PM	17	B	-		44	D	14	B	6	A	-		43	D	19	B	11	B	21	C	17	B
Hwy 169 & Lind/River North U-Turn	AM	4	A	33	C	-		4	A	-		-		-		3	A	-		-		-	
Signalized Intersection	PM	4	A	32	C	-		3	A	-		-		-		2	A	-		-		-	
Hwy 169 & Lind/River South U-Turn	AM	5	A	-		-		2	A	-		73	E	-		4	A	-		-		-	
Signalized Intersection	PM	4	A	-		-		2	A	-		63	E	-		3	A	-		-		-	
Hwy 169 & Webster North U-Turn	AM	4	A	72	E	-		5	A	-		-		-		1	A	-		-		-	
Signalized Intersection	PM	4	A	74	E	-		3	A	-		-		-		1	A	-		-		-	
Hwy 169 & Webster South U-Turn	AM	10	B	-		-		10	B	-		39	D	-		4	A	-		-		-	
Signalized Intersection	PM	7	A	-		-		7	A	-		27	C	-		3	A	-		-		-	

1. Delay in seconds per vehicle

Table A8: Northern Subarea - Concept 2 - Access Relocation (Combined River Ln/Lind St) - Signalized RCUTs - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																			
		EBR		WBR		NBU		NBL		NBT		NBR		SBU		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & Lind St/River Ln	AM	50	150	200	525	-	-	25	50	175	475	75	250	-	-	100	250	100	275	25	150
Signalized Intersection	PM	50	225	350	650	-	-	25	75	375	750	100	500	-	-	200	500	275	675	50	400
Hwy 169 & Webster Ave	AM	175	375	25	125	-	-	75	150	125	275	25	50	-	-	25	75	75	200	50	100
Signalized Intersection	PM	150	325	50	125	-	-	100	175	150	350	25	50	-	-	25	100	200	400	100	175
Hwy 169 & Lind/River North U-Turn	AM	-	-	-	-	50	125	-	-	25	200	-	-	-	-	-	-	50	125	-	-
Signalized Intersection	PM	-	-	-	-	75	175	-	-	-	-	-	-	-	-	-	-	75	175	-	-
Hwy 169 & Lind/River South U-Turn	AM	-	-	-	-	-	-	-	-	50	175	-	-	100	200	-	-	-	-	-	-
Signalized Intersection	PM	-	-	-	-	-	-	-	-	50	175	-	-	100	150	-	-	25	100	-	-
Hwy 169 & Webster North U-Turn	AM	-	-	-	-	50	125	-	-	0	25	-	-	-	-	-	-	25	50	-	-
Signalized Intersection	PM	-	-	-	-	75	175	-	-	25	50	-	-	-	-	-	-	50	200	-	-
Hwy 169 & Webster South U-Turn	AM	-	-	-	-	-	-	-	-	100	225	-	-	175	300	-	-	-	-	-	-
Signalized Intersection	PM	-	-	-	-	-	-	-	-	125	225	-	-	175	300	-	-	25	75	-	-

Table A9a: Northern Subarea - Concept 3 - Combined River Ln/Lind St/Webster Ave (At Grade Signal) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																					
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
Hwy 169 & Lind St/River Ln/Webster Ave	AM	41	D	69	E	36	D	11	B	68	E	32	C	9	A	96	F	40	D	23	C	63	E	49	D	42	D
Signalized Intersection	PM	45	D	62	E	53	D	15	B	69	E	37	D	13	B	75	E	33	C	18	B	90	F	57	E	34	C

1. Delay in seconds per vehicle

Table A10a: Northern Subarea - Concept 3 - Combined River Ln/Lind St/Webster Ave (At Grade Signal) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																							
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & Lind St/River Ln/Webster Ave	AM	225	325	200	625	75	275	100	200	75	450	200	425	100	300	275	475	75	275	150	275	250	425	75	150
Signalized Intersection	PM	200	325	75	475	75	325	125	275	75	500	225	425	150	425	400	725	150	500	200	425	275	450	100	300

Table A9b: Northern Subarea - Concept 3 - Combined River Ln/Lind St/Webster Ave (Interchange) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																					
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
SB TH 169 Ramps	AM	6	A	-		-		-		6	A	-		6	A	-		8	A	6	A	4	A	5	A	-	
Roundabout	PM	11	B	-		-		-		17	C	-		17	C	-		8	A	7	A	4	A	5	A	-	
NB TH 169 Ramps	AM	18	C	22	C	-		21	C	-		-		-		10	B	10	A	-		-		27	D	25	D
Roundabout	PM	10	B	8	A	-		9	A	-		-		-		6	A	7	A	-		-		18	C	15	C

1. Delay in seconds per vehicle

Table A10b: Northern Subarea - Concept 3 - Combined River Ln/Lind St/Webster Ave (Interchange) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																							
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
SB TH 169 Ramps	AM	-		75	175	75	175	25	25	25	25	-		-		-		-		50	175	-		50	175
Roundabout	PM	-		75	200	75	200	25	75	25	75	-		-		-		-		125	325	-		125	325
NB TH 169 Ramps	AM	75	275	75	275	-		-		150	500	150	500	125	375	-		125	375	-		-		-	
Roundabout	PM	50	175	50	175	-		-		125	350	125	350	75	175	-		75	175	-		-		-	

Table A11: Northern Subarea - Concept 4 - Full Cloverleaf Interchange- 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																			
				NBL	NBT		NBR		SBL	SBT		SBR		EBL	EBT		EBR		WBL	WBT		WBR	
SB TH 169 at WB TH 14 Ent & NB TH 169 at WB TH 14 Exit	AM	0	A	-	0	A	-		-	0	A	1	A	-	-		-		-	-		1	A
Stop Controlled	PM	0	A	-	0	A	-		-	0	A	2	A	-	-		-		-	-		0	A
SB TH 169 at WB TH 14 Exit Ramp & NB TH 169 at WB TH 14 Ent	AM	0	A	-	0	A	0	A	-	0	A	-		-	-		1	A	-	-		-	
Stop Controlled	PM	1	A	-	0	A	0	A	-	0	A	-		-	-		1	A	-	-		-	
SB TH 169 at EB TH 14 Ent &NB TH 169 at EB TH 14 Exit	AM	1	A	-	0	A	-		-	1	A	1	A	-	-		-		-	-		0	A
Stop Controlled	PM	1	A	-	0	A	-		-	1	A	1	A	-	-		-		-	-		0	A
EB TH 14 Exit & Hwy 169	AM	0	A	-	0	A	-		-	0	A	-		-	0	A	1	A	-	-		-	
Stop Controlled	PM	0	A	-	0	A	-		-	0	A	-		-	0	A	0	A	-	-		-	
NB TH 169 & EB TH 14 Ent	AM	1	A	-	1	A	1	A	-	1	A	-		-	-		-		-	-		-	
Stop Controlled	PM	1	A	-	1	A	1	A	-	0	A	-		-	-		-		-	-		-	
TH 14 & EB TH 14 Exit	AM	2	A	-	4	A	3	A	-	0	A	-		-	-		-		-	-		-	
Stop Controlled	PM	2	A	-	5	A	4	A	-	0	A	-		-	-		-		-	-		-	
TH 14 & WB TH 14 Ent	AM	2	A	-	-		-		-	-		6	A	-	1	A	-		-	2	A	-	
Stop Controlled	PM	2	A	-	-		-		-	-		6	A	-	1	A	-		-	3	A	-	
TH 14 at WB TH 14 Exit (to SB TH 169) & TH 14 at EB TH 14 Ent (from SB TH 169)	AM	1	A	-	-		0	A	-	-		-		-	2	A	-		-	1	A	1	A
Stop Controlled	PM	2	A	-	-		0	A	-	-		-		-	2	A	-		-	2	A	1	A
TH 14 at WB TH 14 Ent (from NB TH 169) & TH 14 at EB TH 14 Exit (to NB TH 169)	AM	1	A	-	-		-		-	-		0	A	-	1	A	0	A	-	2	A	-	
Stop Controlled	PM	3	A	-	-		-		-	-		0	A	-	1	A	0	A	-	4	A	-	
TH 14 & WB TH 14 Exit	AM	2	A	-	1	A	1	A	-	-		-		-	2	A	-		-	1	A	1	A
Stop Controlled	PM	3	A	-	1	A	1	A	-	-		-		-	3	A	-		-	4	A	1	A

1. Delay in seconds per vehicle

Table A12: Northern Subarea - Concept 4 - Full Cloverleaf Interchange - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																					
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
SB TH 169 at WB TH 14 Ent & NB TH 169 at WB TH 14 Exit	AM	-		-		-		-		-		0	0	-		0	0	-		-		0	0	0	0
Stop Controlled	PM	-		-		-		-		-		0	0	-		0	0	-		-		0	0	0	0
SB TH 169 at WB TH 14 Exit Ramp & NB TH 169 at WB TH 14 Ent	AM	-		-		0	0	-		-		-		-		0	0	0	0	-		0	0	-	
Stop Controlled	PM	-		-		0	0	-		-		-		-		0	0	0	0	-		0	0	-	
SB TH 169 at EB TH 14 Ent &NB TH 169 at EB TH 14 Exit	AM	-		-		-		-		-		0	0	-		0	0	-		-		0	0	0	0
Stop Controlled	PM	-		-		-		-		-		0	0	-		0	0	-		-		0	0	0	0
EB TH 14 Exit & Hwy 169	AM	-		0	0	0	0	-		-		-		-		0	0	-		-		0	0	-	
Stop Controlled	PM	-		0	0	0	0	-		-		-		-		0	0	-		-		0	0	-	
NB TH 169 & EB TH 14 Ent	AM	-		-		-		-		-		-		-		0	0	0	0	-		0	25	-	
Stop Controlled	PM	-		-		-		-		-		-		-		0	0	0	0	-		0	0	-	
TH 14 & EB TH 14 Exit	AM	-		-		-		-		-		-		-		0	0	0	0	-		0	0	-	
Stop Controlled	PM	-		-		-		-		-		-		-		0	0	0	0	-		0	25	-	
TH 14 & WB TH 14 Ent	AM	-		0	0	-		-		0	0	-		-		-		-		-		-		0	25
Stop Controlled	PM	-		0	0	-		-		0	0	-		-		-		-		-		-		0	25
TH 14 at WB TH 14 Exit (to SB TH 169) & TH 14 at EB TH 14 Ent (from SB TH 169)	AM	-		0	0	-		-		0	0	0	0	-		-		0	0	-		-		-	
Stop Controlled	PM	-		0	0	-		-		0	0	0	0	-		-		0	0	-		-		-	
TH 14 at WB TH 14 Ent (from NB TH 169) & TH 14 at EB TH 14 Exit (to NB TH 169)	AM	-		0	0	0	0	-		0	0	-		-		-		-		-		-		0	0
Stop Controlled	PM	-		0	0	0	0	-		0	0	-		-		-		-		-		-		0	0
TH 14 & WB TH 14 Exit	AM	-		0	25	-		-		0	0	0	0	-		0	0	0	25	-		-		-	
Stop Controlled	PM	-		0	50	-		-		0	0	0	0	-		0	0	0	0	-		-		-	

Table A13a: Northern Subarea - Concept 4 - Eliminate South Loop (Roundabout) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBT		NBR		SBL		SBT		EBL		EBR	
Hwy 169 & EB TH 14 Ramps	AM	63	F	7	A	5	A	3	A	3	A	330	F	435	F
Roundabout	PM	45	E	10	B	4	A	4	A	4	A	371	F	444	F

1. Delay in seconds per vehicle

Table A14a: Northern Subarea - Concept 4 - Eliminate South Loop (Roundabout) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)											
		EBL		EBR		NBT		NBR		SBL		SBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & EB TH 14 Ramps	AM	975	2225	2350	4900	25	350	25	250	0	50	0	50
Roundabout	PM	975	3075	1500	3225	50	325	25	200	0	125	0	125

Table A13b: Northern Subarea - Concept 4 - Eliminate South Loop (Signal) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBT		NBR		SBL		SBT		EBL		EBR	
Hwy 169 & EB TH 14 Ramps	AM	19	B	18	B	13	B	60	E	10	B	47	D	26	C
Signalized Intersection	PM	22	C	27	C	18	B	61	E	8	A	57	E	24	C

1. Delay in seconds per vehicle

Table A14b: Northern Subarea - Concept 4 - Eliminate South Loop (Signal) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)											
		EBL		EBR		NBT		NBR		SBL		SBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & EB TH 14 Ramps	AM	150	275	150	375	150	325	50	375	150	250	150	300
Signalized Intersection	PM	150	300	100	250	275	525	150	500	150	275	150	350

Table A15a: Northern Subarea - Concept 4 - Diverging Diamond - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																			
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
TH 169 Crossover (North)	AM	8	A	-		8	A	-		-		14	B	1	A	-		-		-		-		-		-	
Signalized Intersection	PM	9	A	-		5	A	-		-		15	B	0	A	-		-		-		-		-		-	
WBL TH 14 Exit Ramp at SB TH 169	AM	8	A	-		-		-		-		2	A	-		-		-		-		16	B	-		-	
Signalized Intersection	PM	10	B	-		-		-		-		3	A	-		-		-		-		17	B	-		-	
TH 169 Crossover (South)	AM	10	B	-		13	B	-		-		8	A	-		-		-		-		-		-		-	
Signalized Intersection	PM	11	B	-		14	B	-		-		9	A	-		-		-		-		-		-		-	
EBL TH 14 Exit Ramp at NB TH 169	AM	5	A	-		2	A	-		-		-		-		16	B	-		-		-		-		-	
Signalized Intersection	PM	4	A	-		2	A	-		-		-		-		13	B	-		-		-		-		-	
WBR TH 14 Exit Ramp at NB TH 169	AM	4	A	-		1	A	-		-		-		-		-		-		-		-		-		10	B
Stop Controlled	PM	4	A	-		2	A	-		-		-		-		-		-		-		-		-		12	B
WB TH 14 Exit (WBL/WBR Split)	AM	1	A	-		-		-		-		-		-		-		-		-		1	A	-		0	A
Stop Controlled	PM	4	A	-		-		-		-		-		-		-		-		-		5	A	-		1	A
WB TH 14 Entrance (SBR/NBL Merge)	AM	2	A	-		-		-		-		-		-		-		-		-		-		0	A	2	A
Stop Controlled	PM	1	A	-		-		-		-		-		-		-		-		-		-		0	A	1	A
NB Hwy 169 at NBT/NBR Split	AM	2	A	-		2	A	3	A	-		-		-		-		-		-		-		-		-	
Stop Controlled	PM	5	A	-		7	A	3	A	-		-		-		-		-		-		-		-		-	
EBR TH 14 Exit Ramp at SB TH 169	AM	4	A	-		-		-		-		2	A	-		-		-		12	B	-		-		-	
Signalized Intersection	PM	3	A	-		-		-		-		2	A	-		-		-		12	B	-		-		-	
EB TH 14 Entrance (NBR/SBL Merge)	AM	4	A	-		-		-		-		-		-		-		1	A	4	A	-		-		-	
Stop Controlled	PM	3	A	-		-		-		-		-		-		-		2	A	4	A	-		-		-	
SB TH 169 at EB TH 14 Entrance Ramp	AM	4	A	-		-		-		3	A	4	A	-		-		-		-		-		-		-	
Stop Controlled	PM	8	A	-		-		-		8	A	8	A	-		-		-		-		-		-		-	
NB TH 169 at WB TH 14 Entrance Ramp	AM	2	A	3	A	1	A	-		-		-		-		-		-		-		-		-		-	
Stop Controlled	PM	2	A	3	A	2	A	-		-		-		-		-		-		-		-		-		-	
EB TH 14 Exit (EBL/EBR Split)	AM	1	A	-		-		-		-		-		-		1	A	-		1	A	-		-		-	
Stop Controlled	PM	1	A	-		-		-		-		-		-		2	A	-		1	A	-		-		-	

1. Delay in seconds per vehicle

Table A16a: Northern Subarea - Concept 4 - Diverging Diamond - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																							
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
TH 169 Crossover (North)	AM	-		-		-		-		-		-		-		100	175	-		-		125	200	0	0
Signalized Intersection	PM	-		-		-		-		-		-		-		50	150	-		-		150	225	0	0
WBL TH 14 Exit Ramp at SB TH 169	AM	-		-		-		125	200	-		-		-		-		-		-		0	25	-	
Signalized Intersection	PM	-		-		-		175	225	-		-		-		-		-		-		0	25	-	
TH 169 Crossover (South)	AM	-		-		-		-		-		-		-		150	175	-		-		125	125	-	
Signalized Intersection	PM	-		-		-		-		-		-		-		175	200	-		-		125	150	-	
EBL TH 14 Exit Ramp at NB TH 169	AM	100	175	-		-		-		-		-		-		0	25	-		-		-		-	
Signalized Intersection	PM	75	150	-		-		-		-		-		-		0	25	-		-		-		-	
WBR TH 14 Exit Ramp at NB TH 169	AM	-		-		-		-		-		75	150	-		0	25	-		-		-		-	
Stop Controlled	PM	-		-		-		-		-		75	150	-		0	25	-		-		-		-	
WB TH 14 Exit (WBL/WBR Split)	AM	-		-		-		25	75	-		0	0	-		-		-		-		-		-	
Stop Controlled	PM	-		-		-		25	150	-		0	0	-		-		-		-		-		-	
WB TH 14 Entrance (SBR/NBL Merge)	AM	-		-		-		-		0	50	50	150	-		-		-		-		-		-	
Stop Controlled	PM	-		-		-		-		0	25	25	75	-		-		-		-		-		-	
NB Hwy 169 at NBT/NBR Split	AM	-		-		-		-		-		-		-		25	100	0	25	-		-		-	
Stop Controlled	PM	-		-		-		-		-		-		-		50	150	0	0	-		-		-	
EBR TH 14 Exit Ramp at SB TH 169	AM	-		-		100	200	-		-		-		-		-		-		-		0	25	-	
Signalized Intersection	PM	-		-		75	175	-		-		-		-		-		-		-		0	25	-	
EB TH 14 Entrance (NBR/SBL Merge)	AM	-		0	0	75	175	-		-		-		-		-		-		-		-		-	
Stop Controlled	PM	-		0	50	75	150	-		-		-		-		-		-		-		-		-	
SB TH 169 at EB TH 14 Entrance Ramp	AM	-		-		-		-		-		-		-		-		-		50	200	75	200	-	
Stop Controlled	PM	-		-		-		-		-		-		-		-		-		100	250	100	250	-	
NB TH 169 at WB TH 14 Entrance Ramp	AM	-		-		-		-		-		-		0	0	0	25	-		-		-		-	
Stop Controlled	PM	-		-		-		-		-		-		0	25	0	25	-		-		-		-	
EB TH 14 Exit (EBL/EBR Split)	AM	0	25	-		0	25	-		-		-		-		-		-		-		-		-	
Stop Controlled	PM	0	0	-		0	0	-		-		-		-		-		-		-		-		-	

Table A15b: Northern Subarea - Concept 4 - Eliminate Both Loops (Roundabout) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																	
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBR		WBL		WBR	
Hwy 169 & WB TH 14 Ramps	AM	17	C	8	A	3	A	-		-		24	C	25	D	-		-		25	D	21	C
Roundabout	PM	78	F	8	A	4	A	-		-		42	E	49	E	-		-		201	F	273	F
Hwy 169 & EB TH 14 Ramps	AM	22	C	-		7	A	5	A	3	A	2	A	-		84	F	123	F	-		-	
Roundabout	PM	10	B	-		9	A	4	A	4	A	3	A	-		36	E	52	F	-		-	

1. Delay in seconds per vehicle

Table A16b: Northern Subarea - Concept 4 - Eliminate Both Loops (Roundabout) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																			
		EBL		EBR		WBL		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & WB TH 14 Ramps	AM	-		-		50	425	25	250	25	150	25	150	-		-		75	475	75	475
Roundabout	PM	-		-		675	1600	625	1650	0	100	0	75	-		-		150	550	150	550
Hwy 169 & EB TH 14 Ramps	AM	50	575	525	1900	-		-		-		25	350	25	250	0	125	0	125	-	
Roundabout	PM	25	200	75	450	-		-		-		25	300	25	200	0	125	0	125	-	

Table A17: Northern Subarea - Concept 4 - Signalize EB TH 14 Exit Ramp - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																			
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT	WBR
Hwy 169 & EB TH 14 Ramps	AM	12	B	-		5	A	-		-		6	A	-		46	D	-		20	C	-		-	-
Signalized Intersection	PM	9	A	-		4	A	-		-		5	A	-		48	D	-		19	B	-		-	-

1. Delay in seconds per vehicle

Table A18: Northern Subarea - Concept 4 - Signalize EB TH 14 Exit Ramp - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																							
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & EB TH 14 Ramps	AM	150	250	-	-	125	300	-	-	-	-	-	-	-	-	100	225	-	-	-	-	125	250	-	-
Signalized Intersection	PM	125	250	-	-	100	200	-	-	-	-	-	-	-	-	125	275	-	-	-	-	125	250	-	-

Table A19: Detailed Vissim Analysis - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																							
				NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
Hwy 169 & EB TH 14 Ramps	AM	18	B	-		20	C	4	A	66	E	10	B	-		48	D	-		32	C	-		-		-	
Signalized Intersection	PM	17	B	-		18	B	5	A	62	E	7	A	-		61	E	-		37	D	-		-		-	
Hwy 169 & Lind St/River Ln	AM	8	A	7	A	5	A	6	A	12	B	8	A	8	A	45	E	40	E	31	D	15	C	19	C	2	A
Roundabout	PM	9	A	10	B	8	A	8	A	13	B	10	B	9	A	37	E	41	E	29	D	19	C	15	C	2	A
Hwy 169 & Webster Ave	AM	10	B	16	C	11	B	11	B	5	A	5	A	5	A	24	C	6	A	11	B	67	F	31	D	41	E
Roundabout	PM	10	B	11	B	7	A	6	A	7	A	6	A	6	A	26	D	33	D	13	B	42	E	39	E	27	D

1. Delay in seconds per vehicle

Table A20: Detailed Vissim Analysis - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)																							
		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & EB TH 14 Ramps	AM	75	325	-	-	75	450	-	-	-	-	-	-	-	-	50	325	25	375	75	350	50	350	-	-
Signalized Intersection	PM	75	325	-	-	50	275	-	-	-	-	-	-	-	-	75	425	25	425	75	325	25	300	-	-
Hwy 169 & Lind St/River Ln	AM	25	225	25	225	25	225	25	125	25	125	0	0	25	300	25	300	25	300	25	425	25	425	25	425
Roundabout	PM	25	175	25	175	25	175	25	150	25	150	0	0	50	425	50	425	50	425	25	425	25	425	25	425
Hwy 169 & Webster Ave	AM	50	425	50	425	50	425	25	200	25	200	25	200	50	375	50	375	50	375	25	275	25	275	25	275
Roundabout	PM	75	550	75	550	75	550	25	200	25	200	25	200	50	325	50	325	50	325	25	300	25	300	25	300

Concept Evaluation Traffic Operations Memo
Appendix B:
Northern Subarea Concept Drawings

MAPO
MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION

BOLTON & MENK
Real People. Real Solutions.

LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

100 0 100 200
scale 50 feet

W LIND CT

N RIVER DR

169

14

W LIND ST

HINIKER POND

SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

SEH PROJECT NO. 154596

DATE: 3/4/2021

US 169 CORRIDOR STUDY

US 14 SOUTH RAMP GREEN T

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3/4/2021
shotchkin
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LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

INSET 1 - SOUTH RAMP ALTERNATIVE GEOMETRICS

200 0 200 400
scale 100 feet

MINNESOTA RIVER

W LIND CT

N RIVER LN

PAULEY CT

N RIVER DR

169

RANGE ST

W LIND ST

14

HINIKER POND

WEBSTER AVE

CROSS ST

RANGE ST

SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

SEH PROJECT NO. 154596

DATE: 7/29/2021

US 169 CORRIDOR STUDY

TRADITIONAL SIGNAL AT US 14 SOUTH RAMP, LIND/RIVER RELOCATION & WEBSTER

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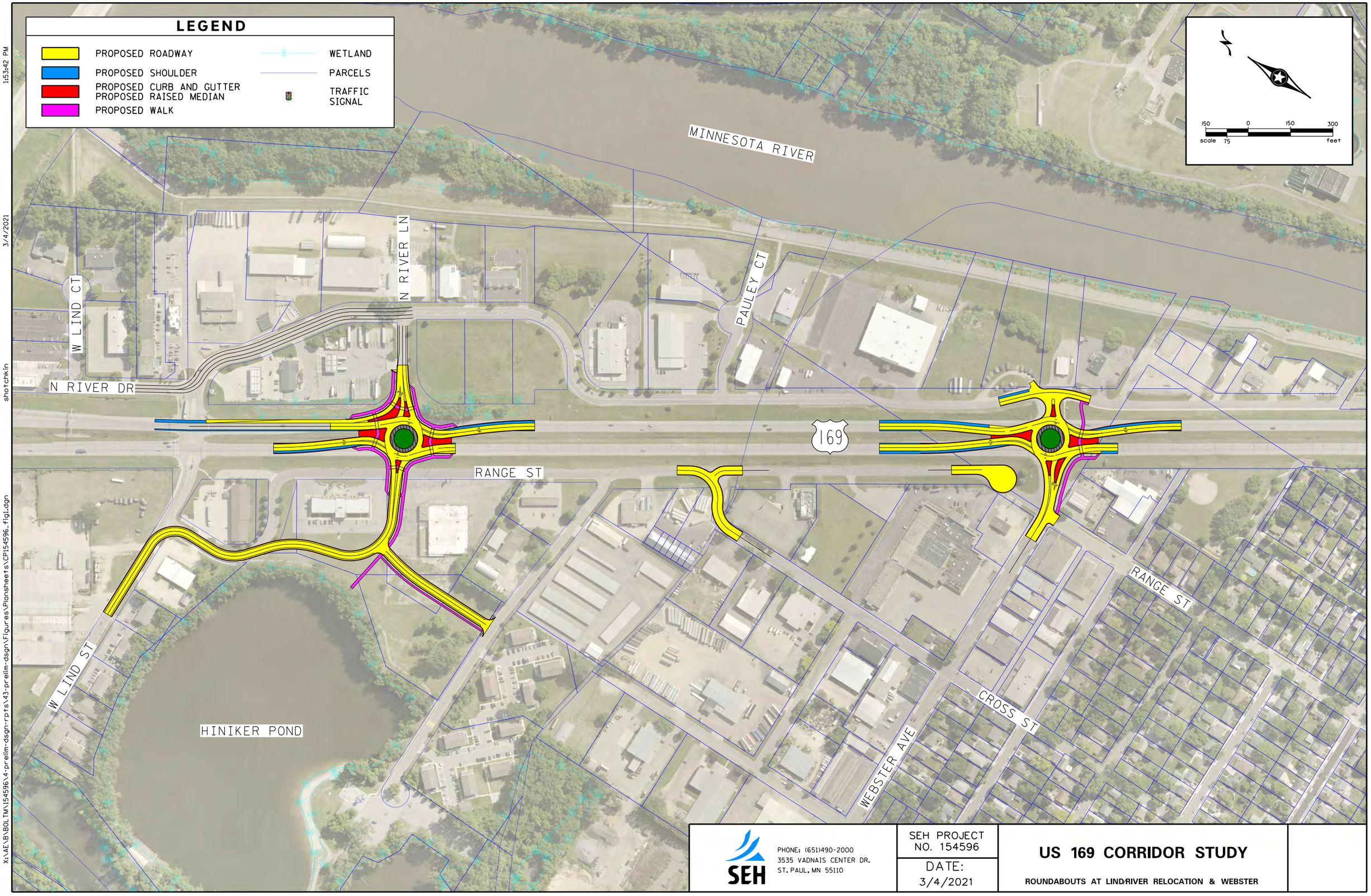

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3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

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DATE: 3/4/2021

US 169 CORRIDOR STUDY

ROUNDABOUTS AT LIND/RIVER RELOCATION & WEBSTER

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LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

150 0 150 300
scale 75 feet

MINNESOTA RIVER
N RIVER LN
PAULEY CT
W LIND CT
N RIVER DR
169
RANGE ST
W LIND ST
HINIKER POND
WEBSTER AVE
CROSS ST
RANGE ST

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ST. PAUL, MN 55110

SEH PROJECT NO. 154596

DATE: 3/4/2021

US 169 CORRIDOR STUDY

RCUT AT LIND/RIVER RELOCATION & WEBSTER

LEGEND

WETLAND

PARCELS

200 0 600

scale feet

14

169

FULL INTERCHANGE NEAR WEBSTER

MINNESOTA RIVER

N RIVER LN

N RIVER DR

W LIND CT

RANGE ST

1 MILE

CLOSE

CROSS ST

R 170'

APPROX. FULL CLOVERLEAF INTERCHANGE

BUTTERWORTH ST

W LIND ST

HINIKER POND

WEBSTER AVE

LAKE ST NW

LAKE ST

COVENTRY LN

SEH

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ST. PAUL, MN 55110

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US 169 CORRIDOR STUDY

FUTURE FREEWAY CONDITION

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LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

N

100 0 100 200
scale 50 feet

169

14

W LIND CT

N RIVER DR

SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

SEH PROJECT NO. 154596

DATE: 3/4/2021

US 169 CORRIDOR STUDY

DIVERGING DIAMOND INTERCHANGE

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LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

N

100 0 100 200
scale 50 feet

169

14

W LIND CT

N RIVER DR

SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

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DATE: 3/4/2021

US 169 CORRIDOR STUDY

ROUNDABOUT INTERCHANGE

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Concept Evaluation Traffic Operations Memo
Appendix C:
Southern Subarea Detailed Traffic Operations

MAPO
MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION

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Table A21: Southern Subarea Section 1 - Concept 1A- 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBR		EBU		EBT		EBR		WBL		WBT	
CSAH 69 (Hawley St) & Hwy 169	AM	26	D	1	A	-		2	A	3	A	189	F	16	C
Stop Controlled	PM	3	A	1	A	-		2	A	3	A	32	D	4	A
CSAH 33 & Hwy 169	AM	5	A	2	A	-		3	A	1	A	33	D	1	A
Stop Controlled	PM	10	B	2	A	-		4	A	1	A	119	F	2	A
Hwy 169 & CSAH 33 EB U-Turn	AM	2	A	-		26	D	2	A	-		-		1	A
Stop Controlled	PM	3	A	-		21	C	4	A	-		-		1	A

1. Delay in seconds per vehicle

Table A22: Southern Subarea Section 1 - Concept 1A - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)											
		EBU		EBT		EBR		WBL		WBT		NBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
CSAH 69 (Hawley St) & Hwy 169	AM	-	-	-	-	25	75	325	1675	375	1675	-	-
Stop Controlled	PM	-	-	-	-	25	25	25	75	-	-	-	-
CSAH 33 & Hwy 169	AM	-	-	-	-	0	25	125	300	25	75	-	-
Stop Controlled	PM	-	-	-	-	25	25	225	450	50	200	-	-
Hwy 169 & CSAH 33 EB U-Turn	AM	25	50	-	-	-	-	-	-	-	-	-	-
Stop Controlled	PM	50	75	25	200	-	-	-	-	-	-	-	-

Table A23: Southern Subarea Section 1 - Concept 1B (All WBLs from Hawley use U-Turn) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)													
				NBR		EBU		EBT		EBR		WBU		WBL		WBT	
CSAH 69 (Hawley St) & Hwy 169	AM	4	A	-		-		3	A	6	A	-		-		4	A
Stop Controlled	PM	2	A	-		-		2	A	3	A	-		-		2	A
CSAH 33 & Hwy 169	AM	6	A	2	A	-		3	A	1	A	-		44	E	1	A
Stop Controlled	PM	16	C	2	A	-		4	A	1	A	-		214	F	2	A
Hwy 169 & CSAH 33 EB U-Turn	AM	3	A	-		34	D	5	A	-		-		-		0	A
Stop Controlled	PM	4	A	-		24	C	6	A	-		-		-		0	A
Hwy 169 & Hawley St WB U-Turn	AM	8	A	-		-		1	A	-		77	F	-		2	A
Stop Controlled	PM	4	A	-		-		0	A	-		247	F	-		5	A

1. Delay in seconds per vehicle

Table A24: Southern Subarea Section 1 - Concept 1B (All WBLs from Hawley use U-Turn) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Movement Delay (sec/veh)													
		NBR		EBU		EBT		EBR		WBU		WBL		WBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
CSAH 69 (Hawley St) & Hwy 169	AM	-		-	-	-		-		-		-		-	
Stop Controlled	PM	-		-	-	-		-		-		-		-	
CSAH 33 & Hwy 169	AM	-		-	-	-		0	25	-		150	350	25	100
Stop Controlled	PM	-		-	-	-		25	50	-		350	650	150	525
Hwy 169 & CSAH 33 EB U-Turn	AM	-		25	75	-		-		-		-		-	-
Stop Controlled	PM	-		50	75	-		-		-		-		0	25
Hwy 169 & Hawley St WB U-Turn	AM	-		-	-	25	50	-		200	600	-		25	350
Stop Controlled	PM	-		-	-	-	-	-		50	125	-		-	-

Table A25: Southern Subarea Section 1 - Concept 1B (Half WBLs from Hawley use U-Turn, Half use CSAH 33) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBR		EBU		EBT		EBR		WBU		WBL		WBT	
CSAH 69 (Hawley St) & Hwy 169	AM	3	A	-		-		2	A	4	A	-		-		4	A
Stop Controlled	PM	2	A	-		-		2	A	3	A	-		-		2	A
CSAH 33 & Hwy 169	AM	25	D	2	A	-		4	A	1	A	-		181	F	3	A
Stop Controlled	PM	21	C	3	A	-		5	A	2	A	-		286	F	3	A
Hwy 169 & CSAH 33 EB U-Turn	AM	5	A	-		75	F	5	A	-		-		-		4	A
Stop Controlled	PM	5	A	-		58	F	6	A	-		-		-		2	A
Hwy 169 & Hawley St WB U-Turn	AM	3	A	-		-		1	A	-		19	C	-		4	A
Stop Controlled	PM	4	A	-		-		0	A	-		250	F	-		6	A

1. Delay in seconds per vehicle

Table A26: Southern Subarea Section 1 - Concept 1B (Half WBLs from Hawley use U-Turn, Half use CSAH 33) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Movement Delay (sec/veh)													
		NBR		EBU		EBT		EBR		WBU		WBL		WBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
CSAH 69 (Hawley St) & Hwy 169	AM	-		-	-	-		-		-		-		-	
Stop Controlled	PM	-		-	-	-		-		-		-		-	
CSAH 33 & Hwy 169	AM	-		-	-	-		-		-		500	875	300	875
Stop Controlled	PM	-		-	-	-		-		-		450	700	275	700
Hwy 169 & CSAH 33 EB U-Turn	AM	-		25	75	-		-		-		-		50	150
Stop Controlled	PM	-		50	125	-		-		-		-		25	75
Hwy 169 & Hawley St WB U-Turn	AM	-		-	-	25	50	-		75	175	-		50	175
Stop Controlled	PM	-		-	-	-	-	-		50	100	-		-	-

Table A27: Southern Subarea Section 1 - Concept 1C (WBL allowed at CSAH 33) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBL		NBR		EBT		EBR		WBL		WBT	
CSAH 69 (Hawley St) & Hwy 169	AM	8	A	28	C	1	A	13	B	7	A	27	C	2	A
Signalized Intersection	PM	6	A	22	C	2	A	8	A	4	A	31	C	5	A
CSAH 33 & Hwy 169	AM	6	A	-		2	A	3	A	1	A	44	E	1	A
Stop Controlled	PM	36	E	-		1	A	6	A	2	A	444	F	5	A

1. Delay in seconds per vehicle

Table A28: Southern Subarea Section 1 - Concept 1C (WBL allowed at CSAH 33) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)											
		NBL		NBR		EBT		EBR		WBL		WBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
CSAH 69 (Hawley St) & Hwy 169	AM	25	50	-	-	125	250	75	175	125	250	-	-
Signalized Intersection	PM	25	75	-	-	100	200	50	100	25	75	-	-
CSAH 33 & Hwy 169	AM	-	-	-	-	-	-	0	25	150	375	25	100
Stop Controlled	PM	-	-	-	-	0	25	0	25	575	1000	475	1000

Table A29: Southern Subarea Section 1 - Concept 1C (All WBLs at Green-T) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBL		NBR		EBT		EBR		WBL		WBT	
CSAH 69 (Hawley St) & Hwy 169	AM	16	b	36	D	1	A	24	C	15	B	34	C	2	A
Signalized Intersection	PM	11	B	33	C	2	A	15	B	7	A	34	C	6	A
CSAH 33 & Hwy 169	AM	2	A	-		2	A	3	A	1	A	-		1	A
Stop Controlled	PM	4	A	-		1	A	6	A	2	A	-		2	A

1. Delay in seconds per vehicle

Table A30: Southern Subarea Section 1 - Concept 1C (All WBLs at Green-T) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)											
		NBL		NBR		EBT		EBR		WBL		WBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
CSAH 69 (Hawley St) & Hwy 169	AM	25	50	-	-	200	400	100	300	250	450	25	175
Signalized Intersection	PM	25	100	-	-	175	325	75	150	125	250	-	-
CSAH 33 & Hwy 169	AM	-	-	-	-	-	-	-	-	-	-	-	-
Stop Controlled	PM	-	-	-	-	-	-	-	-	-	-	-	-

Table A31: Section 1 - Alternative 1D (All WBLs at Green-T) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBL		NBR		EBT		EBR		WBL		WBT	
CSAH 69 (Hawley St) & Hwy 169	AM	2	A	-		1	A	3	A	5	A	-		2	A
Stop Controlled	PM	4	A	-		1	A	5	A	7	A	-		4	A
CSAH 33 & Hwy 169	AM	21	C	39	D	2	A	37	D	14	B	43	D	1	A
Signalized Intersection	PM	15	B	40	D	2	A	24	C	7	A	44	D	2	A

1. Delay in seconds per vehicle

Table A32: Section 1 - Alternative 1D (All WBLs at Green-T) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)											
		NBL		NBR		EBT		EBR		WBL		WBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
CSAH 69 (Hawley St) & Hwy 169	AM	-	-	-	-	-	-	-	-	-	-	-	-
Stop Controlled	PM	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 33 & Hwy 169	AM	25	50	-	-	250	500	25	150	300	550	25	150
Signalized Intersection	PM	50	125	-	-	225	375	25	50	150	275	-	-

Table A33: Southern Subarea Section 2 - Concept 2A - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)					
				SBL		EBL		EBT	
Hwy 68 & Hwy 169	AM	3	A	6	A	2	A	2	A
Stop Controlled	PM	2	A	5	A	1	A	1	A

1. Delay in seconds per vehicle

Table A34: Southern Subarea Section 2 - Concept 2A - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Queue Lengths (ft)					
		SBL		EBL		EBT	
		Avg	Max	Avg	Max	Avg	Max
Hwy 68 & Hwy 169	AM	50	100	-	-	-	-
Stop Controlled	PM	50	100	-	-	-	-

Table A35: Southern Subarea Section 2 - Concept 2B2 (Stop Controlled) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				SBL		SBR		EBL		EBT		WBT		WBR	
Hwy 169 & Hwy 68	AM	2	A	-		7	A	-		3	A	1	A	0	A
Stop Controlled	PM	3	A	-		7	A	-		4	A	1	A	1	A
Hwy 169 & CSAH 69 (Gadwall Rd)	AM	40	E	351	F	160	F	11	B	3	A	3	A	2	A
Stop Controlled	PM	106	F	1115	F	1014	F	12	B	3	A	3	A	2	A

1. Delay in seconds per vehicle

Table A36: Southern Subarea Section 2 - Concept 2B2 (Stop Controlled) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Movement Delay (sec/veh)											
		SBL		SBR		EBL		EBT		WBT		WBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & Hwy 68	AM	-	-	25	75	-	-	-	-	-	-	-	-
Stop Controlled	PM	-	-	25	50	-	-	-	-	-	-	-	-
Hwy 169 & CSAH 69 (Gadwall Rd)	AM	525	1025	50	325	25	50	-	-	-	-	-	-
Stop Controlled	PM	1625	2075	75	400	25	75	-	-	-	-	0	25

Table A37: Southern Subarea Section 2 - Concept 2B2 (Stop Controlled, Acceleration Lane) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				SBL		SBR		EBL		EBT		WBT		WBR	
Hwy 169 & Hwy 68	AM	3	A	-		10	B	-		2	A	4	A	0	A
Stop Controlled	PM	2	A	-		7	A	-		3	A	1	A	1	A
Hwy 169 & CSAH 69 (Gadwall Rd)	AM	11	B	82	F	11	B	12	B	5	A	1	A	1	A
Stop Controlled	PM	15	C	145	F	25	D	14	B	3	A	1	A	0	A

1. Delay in seconds per vehicle

Table A38: Southern Subarea Section 2 - Concept 2B2 (Stop Controlled, Acceleration Lane) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Movement Delay (sec/veh)											
		SBL		SBR		EBL		EBT		WBT		WBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & TH 68	AM	-	-	25	75	-	-	-	-	-	-	-	-
Stop Controlled	PM	-	-	25	50	-	-	-	-	-	-	-	-
Hwy 169 & CSAH 69 (Gadwall Rd)	AM	175	400	25	175	25	50	-	-	-	-	-	-
Stop Controlled	PM	275	575	25	400	25	75	-	-	-	-	-	-

Table A39: Southern Subarea Section 2 - Concept 2B2 (Signalized) - 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				SBL		SBR		EBL		EBT		WBT		WBR	
Hwy 169 & Hwy 68	AM	3	A	-		6	A	-		4	A	1	A	0	A
Stop Controlled	PM	4	A	-		6	A	-		7	A	1	A	1	A
Hwy 169 & CSAH 69 (Gadwall Rd)	AM	11	B	47	D	11	B	25	C	6	A	7	A	3	A
Signalized Intersection	PM	11	B	47	D	8	A	25	C	7	A	7	A	4	A

1. Delay in seconds per vehicle

Table A40: Southern Subarea Section 2 - Concept 2B2 (Signalized) - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Movement Delay (sec/veh)											
		SBL		SBR		EBL		EBT		WBT		WBR	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & Hwy 68	AM	-	-	25	75	-	-	-	-	-	-	-	-
Stop Controlled	PM	-	-	25	50	-	-	-	-	-	-	-	-
Hwy 169 & CSAH 69 (Gadwall Rd)	AM	150	300	25	50	25	50	50	200	75	200	25	50
Signalized Intersection	PM	150	275	25	25	25	75	75	225	75	200	25	50

Table A41: Southern Subarea Section 3 - Concept 3A- 2040 Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)											
				NBR		EBU		EBT		EBR		WBL		WBT	
Hwy 169 & Hwy 60	AM	5	A	2	A	-		2	A	2	A	11	B	7	A
Stop Controlled	PM	8	A	2	A	-		3	A	5	A	68	F	3	A
Hwy 169 EBU-Turn East of Hwy 60	AM	5	A	-		12	B	7	A	-		-		4	A
Stop Controlled	PM	4	A	-		23	C	5	A	-		-		3	A

1. Delay in seconds per vehicle

Table A42: Southern Subarea Section 3 - Concept 3A - 2040 Peak Hour Queues By Movement

Intersection	Peak Hour	Movement Delay (sec/veh)											
		NBR		EBU		EBT		EBR		WBL		WBT	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Hwy 169 & Hwy 60	AM	-	-	-	-	-	-	-	-	50	150	-	-
Stop Controlled	PM	-	-	-	-	-	-	-	-	150	375	25	75
Hwy 169 EBU-Turn East of Hwy 60	AM	-	-	25	50	0	25	-	-	-	-	-	-
Stop Controlled	PM	-	-	25	75	-	-	-	-	-	-	-	-

Concept Evaluation Traffic Operations Memo
Appendix D:
Southern Subarea Concept Drawings

MAPO
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TH 169 - Southern Sub Area
Segment 1
Access Alternative 1A

U-turn area options if sight lines are a concern

Could move to align with 33 (Hemlock)

0.70 mi to Hwy 68

Consider elimination in conjunction with new access south of Hwy 68

Restricted Crossing

Same as existing (Does not allow NB to WB movement)

Hwy 169

Blue Earth River

N

400

SCALE IN FEET

BOLTON & MENK

HWY 169 CORRIDOR STUDY

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TH 169 - Southern Sub Area
Segment 1
Access Alternative 1B

U-turn area options if sight lines are a concern

Could move to align with 33 (Hemlock)

0.70 mi to Hwy 68

Restricted Crossing

Eliminate Entering Hwy 169 at this location

Consider elimination in conjunction with new access south of Hwy 68

Hwy 169

Blue Earth River

N

400

SCALE IN FEET

BOLTON & MENK

HWY 169 CORRIDOR STUDY

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michaelna

LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

N

200 0 200 400
scale 100 feet

MINNESOTA RIVER
AMOS OWEN LN
MCCAULEY ST
BLUE EARTH RIVER
169
CHAPMAN ST
HAWLEY ST
SOUTHBEND AVE
CSAH 33

INSET 1 - ALTERNATIVE GEOMETRICS

SOUTHBEND AVE
CSAH 33

SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

SEH PROJECT NO. 154596

DATE: 6/1/2021

US 169 CORRIDOR STUDY
SOUTH SUBAREA – SECTION 1

GREEN T AT HAWLEY ST

FIGURE No. # 1

LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

N

scale 100 0 200 400 feet

MINNESOTA RIVER

AMOS OWEN LN

MCCAULEY ST

BLUE EARTH RIVER

169

CHAPMAN ST

HAWLEY ST

SOUTHBEND AVE

CSAH 33

INSET 2 - ALTERNATIVE GEOMETRICS

AMOS OWEN LN

MCCAULEY ST

CHAPMAN ST

SEH

PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

SEH PROJECT NO. 154596

DATE: 6/1/2021

US 169 CORRIDOR STUDY SOUTH SUBAREA – SECTION 1

GREEN T AT CSAH 33
AND MUT AT AMOS OWEN LN

FIGURE No. # 2

LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

N

200 0 500
scale feet

TH 68
MINNESOTA RIVER
CSAH 69
MINNEOPA TRAIL
169
SOUTHBEND AVE
PINTAIL ST
BISON ST
RENO ST
CR 120
T-493
551ST AVE

INSET 1 - ALTERNATIVE GEOMETRICS

SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

SEH PROJECT NO. 154596

DATE: 6/1/2021

US 169 CORRIDOR STUDY
SOUTH SUBAREA – SECTION 2

HIGH T AT TH 68, RT IN /RT OUT AT CSAH 69
AND RCUT AT CSAH 120

FIGURE No. # 1

TH 169 - Southern Sub Area
Segment 2
Access Alternative 2B1

Full Access Intersection

Hwy 68

Potential "High T" Candidate (Raise WB)

500
SCALE IN FEET

Hwy 69

Hwy 120

Property Impacts

Hwy 169

0.50 mi

Potentially Right-In Right-Out only

0.70 mi

Hwy 90

- Combines two partial accesses to one full access
- Multiple new connector roads

BOLTON & MENK

HWY 169 CORRIDOR STUDY

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TH 169 - Southern Sub Area
Segment 2
Access Alternative 2B2

Full Access Intersection

Inset

Inset

Hwy 68

Right-in/Right-out

500
SCALE IN FEET

Hwy 169

Hwy 69

Hwy 120

0.65 mi

Property Impacts

Property Impacts

0.50 mi

Hwy 90

- Combines two partial accesses to one full access
- Multiple new connector roads

BOLTON & MENK

HWY 169 CORRIDOR STUDY

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TH 169 - Southern Sub Area
Segment 2
Access Alternative 2C

Full Access Intersection

Hwy 68

Existing Pedestrian Bridge

Hwy 169

Hwy 69

Must use RCUT on Hwy 69 to head EB

Hwy 120

Left turns not allowed (EB on 169 should turn left on 120)

Full Access Intersection could be implemented with closure at Hemlock Rd

SBL not allowed (poor skew angle)

Potentially utilize U Turn area in this location

Hwy 90

Typical RCUT
TH 212 at TH 284, Cologne

- Utilizes RCUTs to reduce crossing manuevers
- limits some direction of travel

N

500

SCALE IN FEET

BOLTON & MENK

HWY 169 CORRIDOR STUDY

LEGEND

- PROPOSED ROADWAY
- PROPOSED SHOULDER
- PROPOSED CURB AND GUTTER
- PROPOSED RAISED MEDIAN
- PROPOSED WALK
- WETLAND
- PARCELS
- TRAFFIC SIGNAL

N

200 0 200 400
scale 100 feet

208TH LN

GADWALL RD

TH 60

169

LOREN DR

207TH MILITARY RD

169

SEH PHONE: (651)490-2000 3535 VADNAIS CENTER DR. ST. PAUL, MN 55110	SEH PROJECT NO. 154596 DATE: 6/1/2021	**US 169 CORRIDOR STUDY** **SOUTH SUBAREA – SECTION 3** RCUT AT US 169 ALONG WITH LOCAL ACCESS CONSOLIDATION	**FIGURE No. # 1**

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TH 169 - Southern Sub Area
Segment 3
Access Alternative 3B

Full Access Intersection

Property Impacts

0.50 mi

Property Impacts

1.20 mi

Cul-de-sac

- Better Spacing
- More Road Construction/Property Impacts

N

700

SCALE IN FEET

BOLTON & MENK

HWY 169 CORRIDOR STUDY

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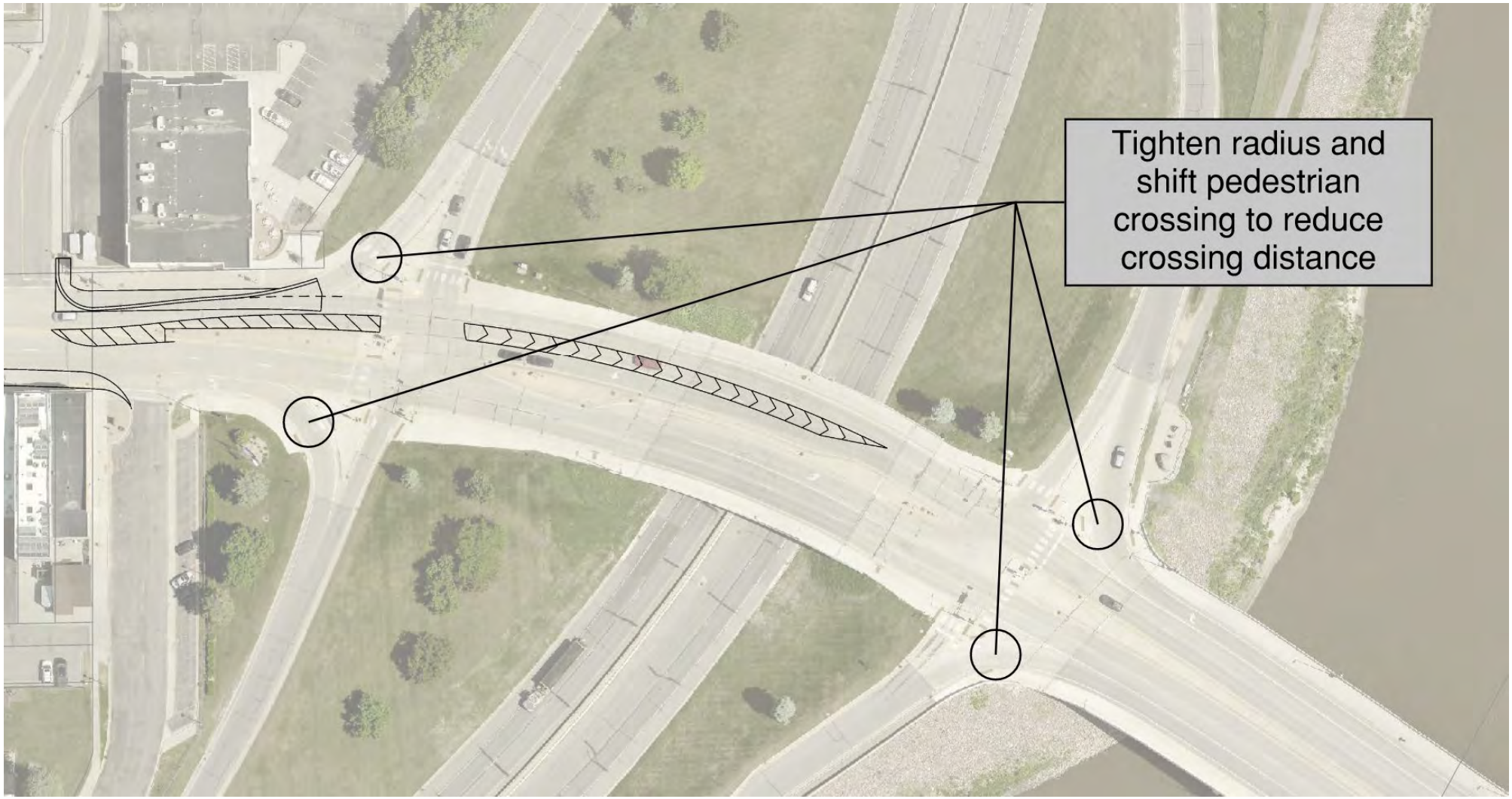
Evaluation Memo Appendix C

MIDDLE SUBAREA CONCEPTS

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

Middle Subarea Concepts

Belgrade Avenue – Westbound Lane Reduction and Pedestrian Crossing Improvements



Pros:
- Improves pedestrian crossings
- Traffic operates well
- Improves traffic flow into potential reduced section west of Highway 169

Cons:
- Cost to construct improvement

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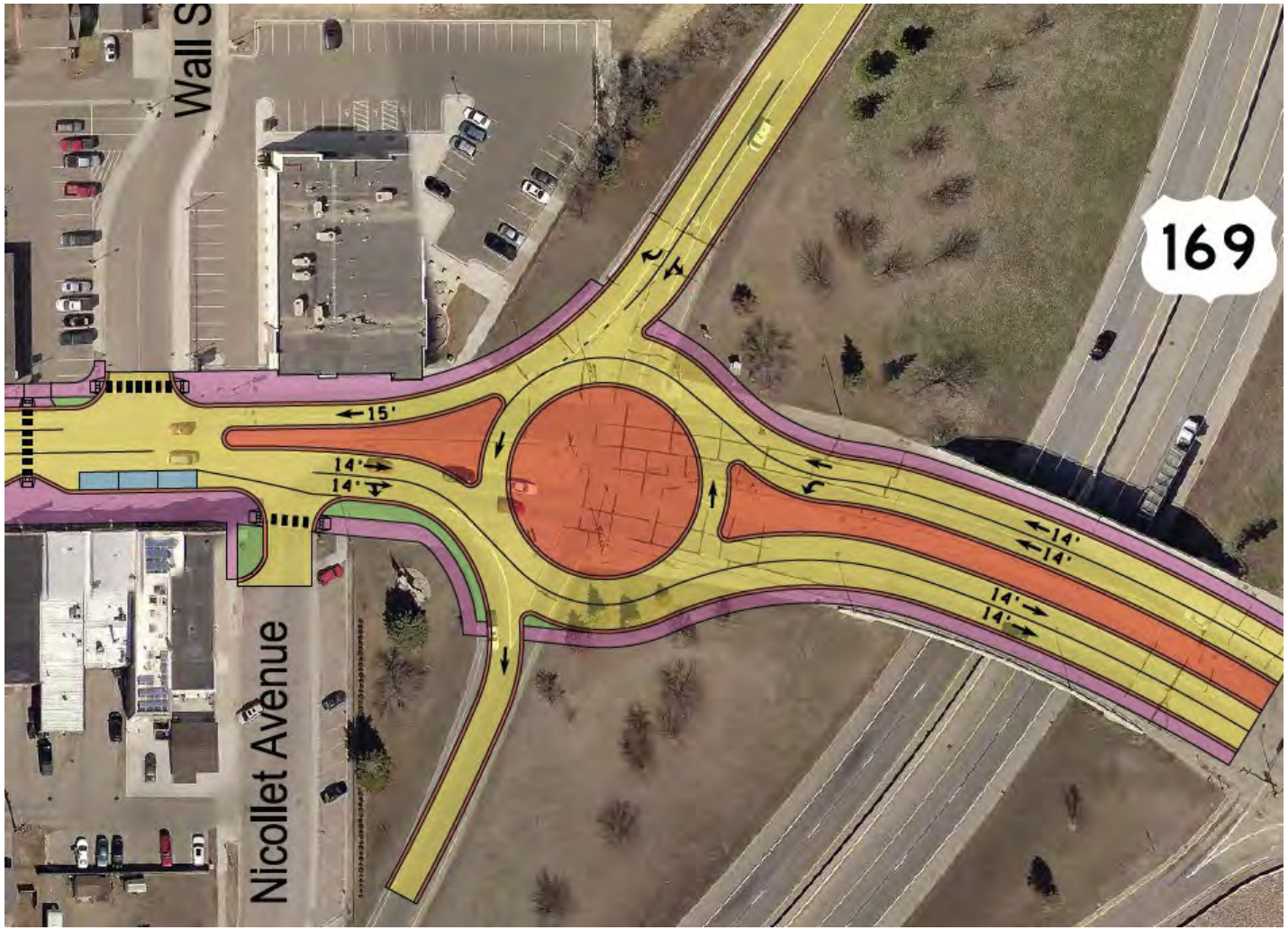
Middle Subarea Concepts

Belgrade Avenue – Roundabout

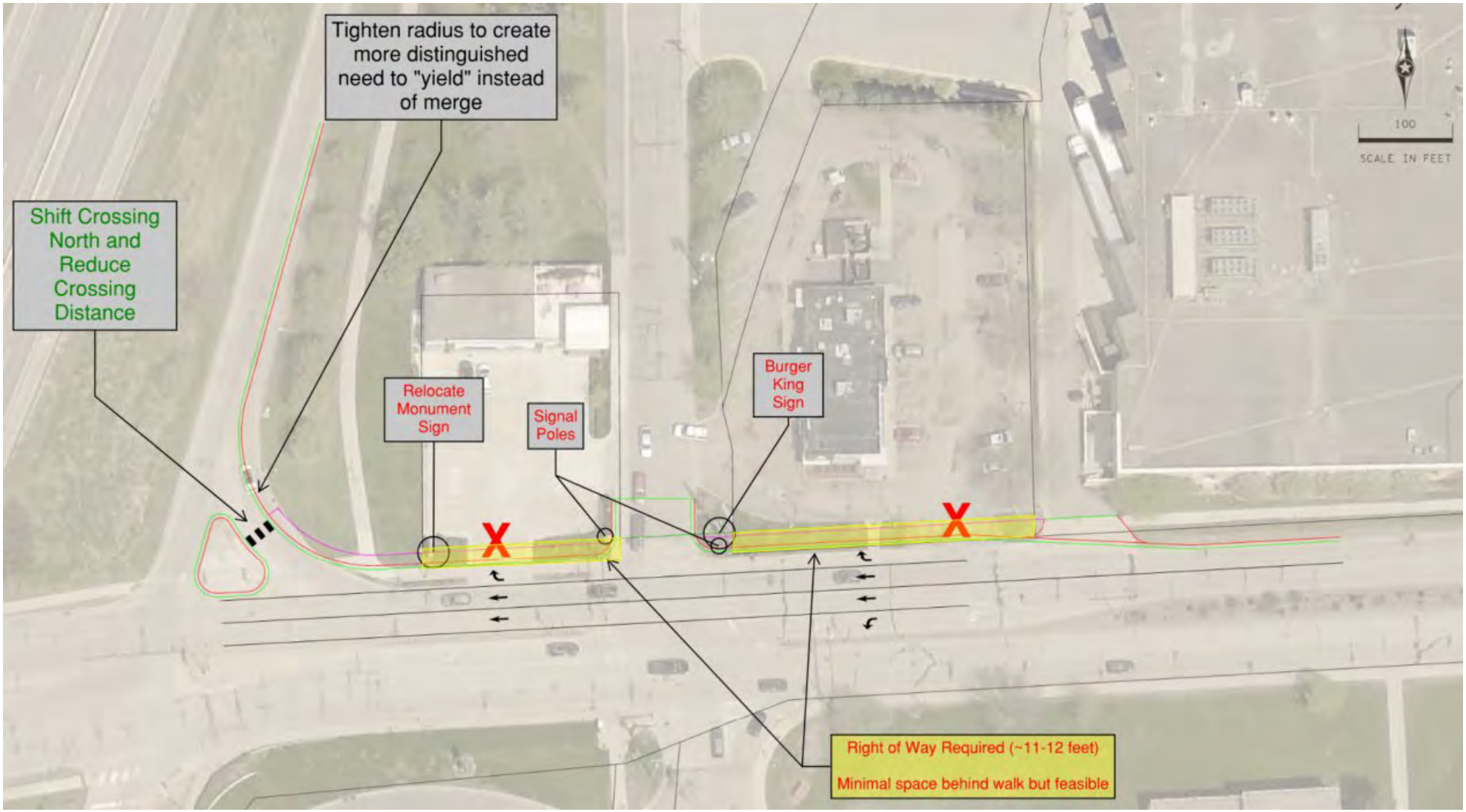


Pros:
- Improves pedestrian crossings
- Traffic operates well
- Improves traffic flow into potential reduced section west of Highway 169

Cons:
- Cost to construct improvement

Middle Subarea Concepts

Riverfront Drive - Right Turn Lane Concept



Pros:
- Improves pedestrian crossing
- Enforces need for WBR traffic to yield
- Adds channelized WBR turn lane
- Reduces WB rear end crashes
- Reduces access along Riverfront Drive

Cons:
- Increases WBR delay (drivers assume free movement under existing conditions)
- Right of way required
- Unlikely business supportive with reduced access

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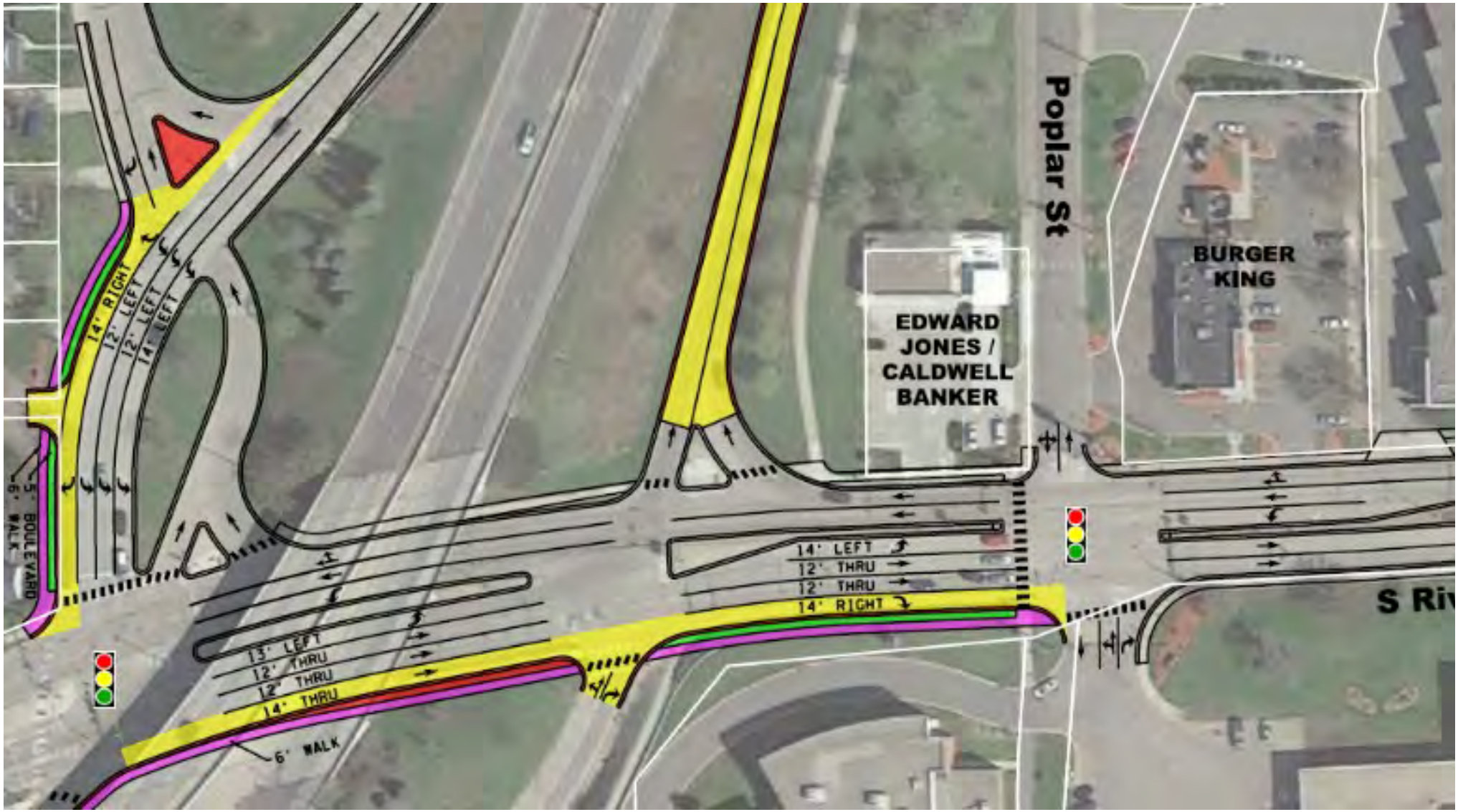
Middle Subarea Concepts

Riverfront Drive - Signalized Corridor Concept



Pros:

- Improves traffic operations with triple SBL and additional lane along northbound ramp
- Full access is maintained at all intersections (at ramps and to the east)

Cons:

- Potential property acquisition
- Potential bridge abutment work to accommodate third lane (or elimination of sidewalk)
- Unfamiliar drivers may not use proper lane and end of weaving/slowing down traffic flow
- Uncertainty of drivers utilizing all three SBL turn lanes as intended

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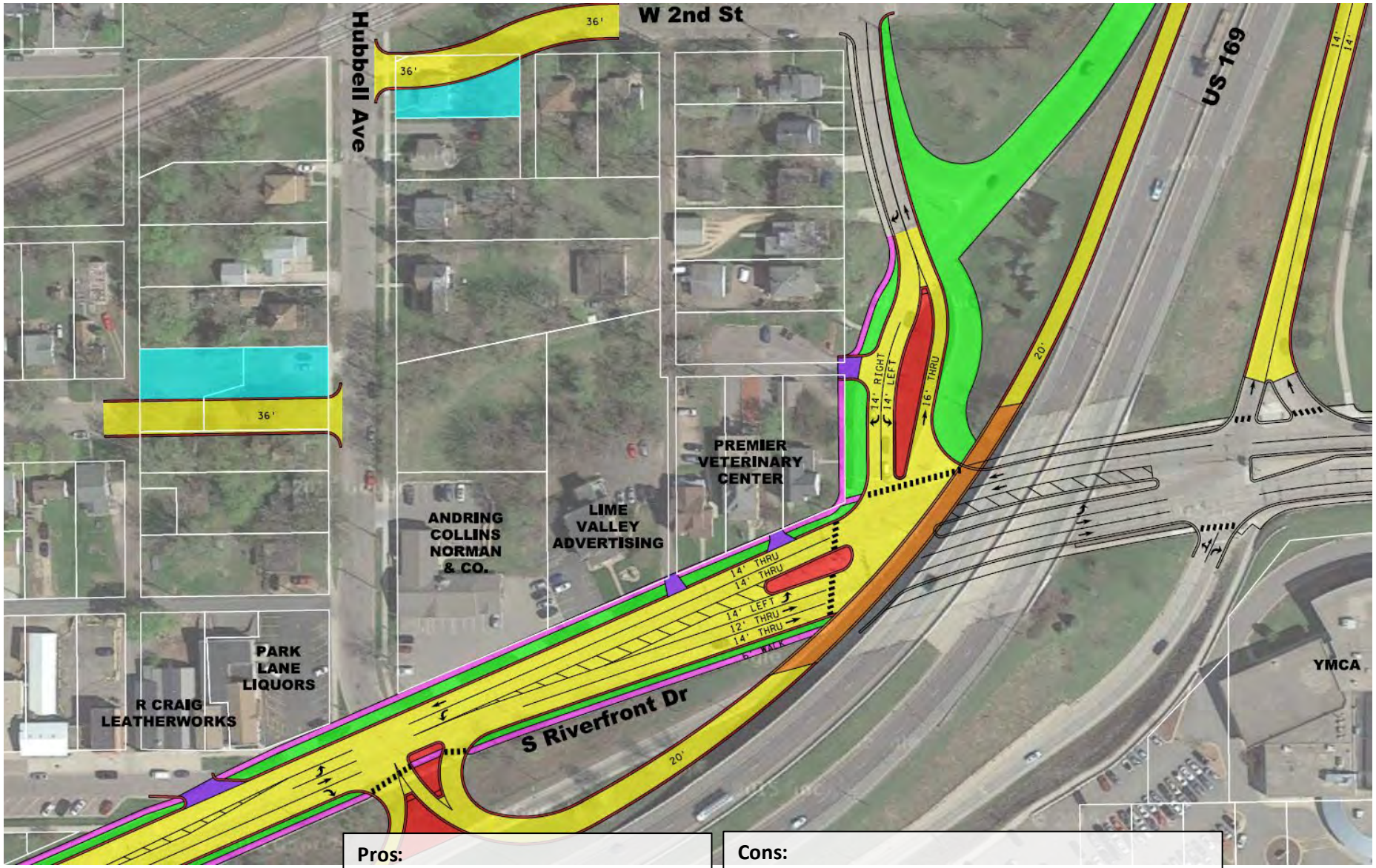
Middle Subarea Concepts

Riverfront Drive - Riverfront Drive West of Highway 169 Concept



Pros:

- Improves traffic operations with existing heavy SBL now an NBR
- Access points east of Highway 169 along Riverfront Drive could remain in place as is

Cons:

- Design challenges with bringing loop ramp down to Riverfront Drive (need to elevate Riverfront Drive)
- $$$
- Lose Hubbell Avenue connection to Riverfront Drive (need additional local connections for circulation)

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Evaluation Memo Appendix D

ENVIRONMENTAL IMPACT SUMMARY

MAPO
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AREA PLANNING ORGANIZATION

Environmental Impact Summary
Highway 169 Corridor Study

Social, Economic or Environmental Topic	Considerations	Existing Conditions	Concept (Negative) Scoring Considerations**
Water Resources	Effects to water resources. Wetlands that may be impacted by partial or complete filling, excavation or drainage, or severance of water supply (see Figure 1)	• The study area falls within the Mankato Watershed of the Minnesota River Basin. The Minnesota and Blue Earth Rivers are identified as impaired streams near the study area. • The study area falls within the Mankato Watershed of the Minnesota River Basin. The Minnesota and Blue Earth Rivers are identified as Public Waters Inventory (PWI) watercourses near the study area over which the MnDNR Waters has regulatory jurisdiction. • There are many small unnamed ponds in the areas surrounding the two rivers. And many of the areas surrounding the rivers and ponds are designated wetlands, either freshwater emergent or freshwater forested. • Other major water features include Hiniker Pond which lies to the west of Highway 169 to the southwest of the Highway 169/Highway 14 interchange.	<u>Northern Subarea:</u> Concept 1A-1C New road alignment north of Hiniker Pond and Highway 14 ramp adjustments pose medium risk for impacts that will need to be studied with a future project. Concept 2A - Highway 14 West to Highway 169 ramp would impact the existing wetland in the northeast quadrant. Highway 14 pedestrian bridge trail concept - Trail connections needed with the TH 14 bridges connection could potentially disturb areas along the MN River.
Floodplains	Development encroachments on the 100-year floodplain (see Figure 2)	• The Corridor falls within the 100- year and 500-year floodplain of the Minnesota River in several sections throughout the study area. • A large portion of the northern subarea is within the 500-year floodplain and small segments of the middle and southern subareas run through the 100-year floodplain (See Figure 2).	<u>Northern Subarea:</u> Concept 2A - The full interchange configuration would warrant modifications to the Minnesota River levee that protects the City of Mankato and North Mankato from flood waters produced by the Minnesota River. Further coordination with FEMA will be required to understand the requirements associated with levee modifications or relocations. Concept 2D - Highway 14 West to Highway 169 ramp would impact the existing wetland and flood levee. Further coordination with FEMA will be required to understand the requirements associated with levee modifications or relocations.
Surface Water Drainage/Water Quality	Effects of drainage modifications. Run-off effects to protected lakes and watercourses	Drainage infrastructure alterations and impervious surface additions may affect the bodies of water. To be considered in future environmental review.*	
Wildlife, Threatened and Endangered Species	• Unique habitats • Widened section • Federal and state listed threatened and endangered species	• MnDNR Natural Heritage Information System (NHIS) data suggests threatened, endangered, and rare species do not exist within the immediate study area. However, species have been identified within close proximity along the shore of the Minnesota River near the Veteran's Memorial Bridge. These locations are separated from the study area by a concrete levee wall and roughly 200 feet of land and the species are aquatic. It is unlikely that roadway alternatives could effect these species. • GIS Data delineating MNDNR, Division of Wildlife Management Areas (WMA) show WMA's are non-existent within the study area.	
Fisheries	• Trout streams • Fish migrations • Spawning runs • Unique habitats	There are no designated trout streams within the study area.	
Vegetation	• Native plant communities • Landscape vegetation • Functional vegetation • High value vegetation • Hazard trees	• The study area is dominated by developed industrial, commercial, and agricultural uses with altered vegetation. • Most of the native plants communities exist in the southern subarea and the Minneopa State Park is directly adjacent the study area here too. In the northern subarea, the Kiwanis Recreation Area is within close proximity to the corridor. • To be considered in future environmental review.*	
Contaminated Properties	Disturbance of contaminated properties may increase project cost (see Figure 3)	• Known history of contamination in the study area. MPCA "What's in My Neighborhood?" sites that are located within 150 feet of the corridor were selected as relevant and can be seen in Figure 3. • More detailed investigations may be recommended for properties with existing/past land uses that may have used hazardous/chemical waste. To be considered in a future environmental review.*	<u>Northern Subarea:</u> Concept 1A-1C Based on environmental screening there are several hazardous waste areas south of the Highway 14 interchange, most south of Hiniker Pond. Concept 1B - Intersection improvements at both River Lane and Webster Avenue have larger disturbance footprint in this area. Concept 2A - An interchange at Webster Avenue would have a larger disturbance footprint in this area. Webster Avenue grade separated pedestrian concept could result in a large disturbance area. <u>Southern Subarea:</u> Concept 2B1 and 2B2 - could disturb hazardous areas near the Highway 120 intersection.
Parks and Recreation Areas (Section 4f/6f Resources)	• Parks and recreation areas • Land and Water Conservation (LAWCON) funds • Wildlife & waterfowl refuges • Historic sites • Landscapes • Highways • Bridges • Buildings & districts • Wildlife management areas • School playgrounds • Fairgrounds • Public multiple-use land holdings • Public golf courses • Archaeological sites • Wild & scenic rivers • Recreational bikeways and trails (see Figure 4)	• The following properties may qualify as Section 4f and are adjacent to the corridor: -Parks • Bluff Park • Kiwanis Recreation Area • Hiniker Park • Riverview Park • Reconciliation Park • Land of Memories Park • Minneopa State Park • The following are LAWCON (Section 6f) properties and are adjacent to the corridor: - Trails • The Minnesota River Trail • The North Star Bridge Trail • The Rex Macbeth River Trail • The West Mankato Trail • Bluff Valley Trail • Hiniker Park Trail • The Kiwanis Mountain Bike Trail • Any impacts to parks and recreational areas to be considered in a future environmental review*	

Environmental Impact Summary
Highway 169 Corridor Study

Social, Economic or Environmental Topic	Considerations	Existing Conditions	Concept (Negative) Scoring Considerations**
Social and Community	• Hospitals • Schools • Libraries • Churches • Government buildings • Post offices	• The following are located within or in close proximity to the study corridor • New Creation World Outreach Church • Mankato West High School • Hillcrest Rehabilitation Center • North Mankato United States Postal Service	
Cultural Resources	Buildings that exceed 50 years in age, archaeological sites, and Traditional Cultural Properties.	• Cultural and Historic properties will need to be reviewed when specific projects are identified for this corridor. Even though there are no designated tribal lands in this area, the confluence of the Blue Earth and Minnesota Rivers has cultural significance for the Dakota people.	<u>Northern Subarea:</u> Highway 14 pedestrian bridge trail concept - Connections needed could potentially disturb areas along the MN River.
Pedestrian & Bicycle Facilities	Bicycle and pedestrian safety	• Sidewalk and trail connections exist along Highway 169 and intersecting roadways in many areas throughout the study area but safe crossings of Highway 169 lack throughout. See 6f resources listed above. • To be considered in future environmental review.*	
Environmental Justice	Disproportionate effects to low-income or minority populations (see Figures 5 and 6)	• There are two block groups above 23 percent minority populations within the study area (Figure 4). Due to the significantly greater minority population compared to the general population than the counties, both of these block groups can be considered environmental justice populations. • There are 11 block groups above 26 percent low-income populations that fall within the project area (Figure 5). The block groups range between 26 percent and 70 percent of populations that have low incomes. Due to the significantly greater low-income concentrations compared to the general population than the counties, all 11 block groups can be considered environmental justice populations.	<u>Southern Subarea:</u> Grade separated pedestrian trail concepts - No Build is high risk given consideration that existing conditions and all proposed concepts do not provide safe pedestrian crossings of Highway 169. Generally for the entire study area, no data suggests that EJ populations use this area significantly more than other populations (i.e., travel to the corridor or drive through it), so there is no reason to assume impacts would be disproportionately high.
Air Quality	• Impacts to air quality • Mobile source air toxins	The need for an air quality analysis, conformity determination, or Mobile Source Air Toxics analysis will be determined once individual improvement projects are identified.*	
Traffic Noise	• Comply with federal noise criteria and Minnesota Noise Standards • Identify sensitive noise receptors	The need for a noise analysis will be determined once individual improvement projects are identified.*	
Construction Noise	• Comply with federal noise criteria and Minnesota Noise Standards • Identify sensitive noise receptors	Construction noise will be further considered in a future environmental review as projects are implemented.* City ordinances can regulate the daytime hours of construction activities in order to minimize potential impacts to adjacent areas.	
Utilities	Impacts to utilities may incur additional project costs.	• To be considered in future environmental review.*	
Erosion	• Erosional effects • Water pollution	To be considered in a future environmental review.*	
Right of Way and Relocation	Effects of right of way acquisition	Additional right-of-way may need to be acquired for future improvement projects. Temporary easements and changes to local roadway and property access points are also likely. Any impacts resulting from right-of-way acquisition, relocation or access changes will be identified in a future environmental review.*	<u>Northern Subarea:</u> Concept 2A - Highway 169 North to Highway 14 East ramp would impact McDonald's building. Grade separated pedestrian concepts north of Lind Street and on the south side of Webster Avenue will require future detailed analysis of grades and bridge type foot print. Built out environment could result in some partial property impacts. <u>Southern Subarea:</u> Concept 2B2 - three partial acquisitions anticipated. Concept 2C - three total acquisitions and four partials anticipated. Concept 3A - five partial acquisitions anticipated. Concept 3B - two total acquisitions and two partials anticipated.
Visual Quality	• Scenic intrusion • Bridges • Lighting • Railings • Grading, Trails • Walls • Fencing • Vegetation Modifications	The proposed project is not anticipated to result in adverse visual impacts.	
Farmland and Soils	• Minimization of effects to agricultural land • Properties of soils • Suitability for roadway construction	• Soil suitability of farmland impacts will be addressed in a future environmental review.*	

*Additional study considerations will be pursued when improvements are identified.
**If a concept is not mentioned it poses low risk for negative impacts.

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Figure 1: Water Resources

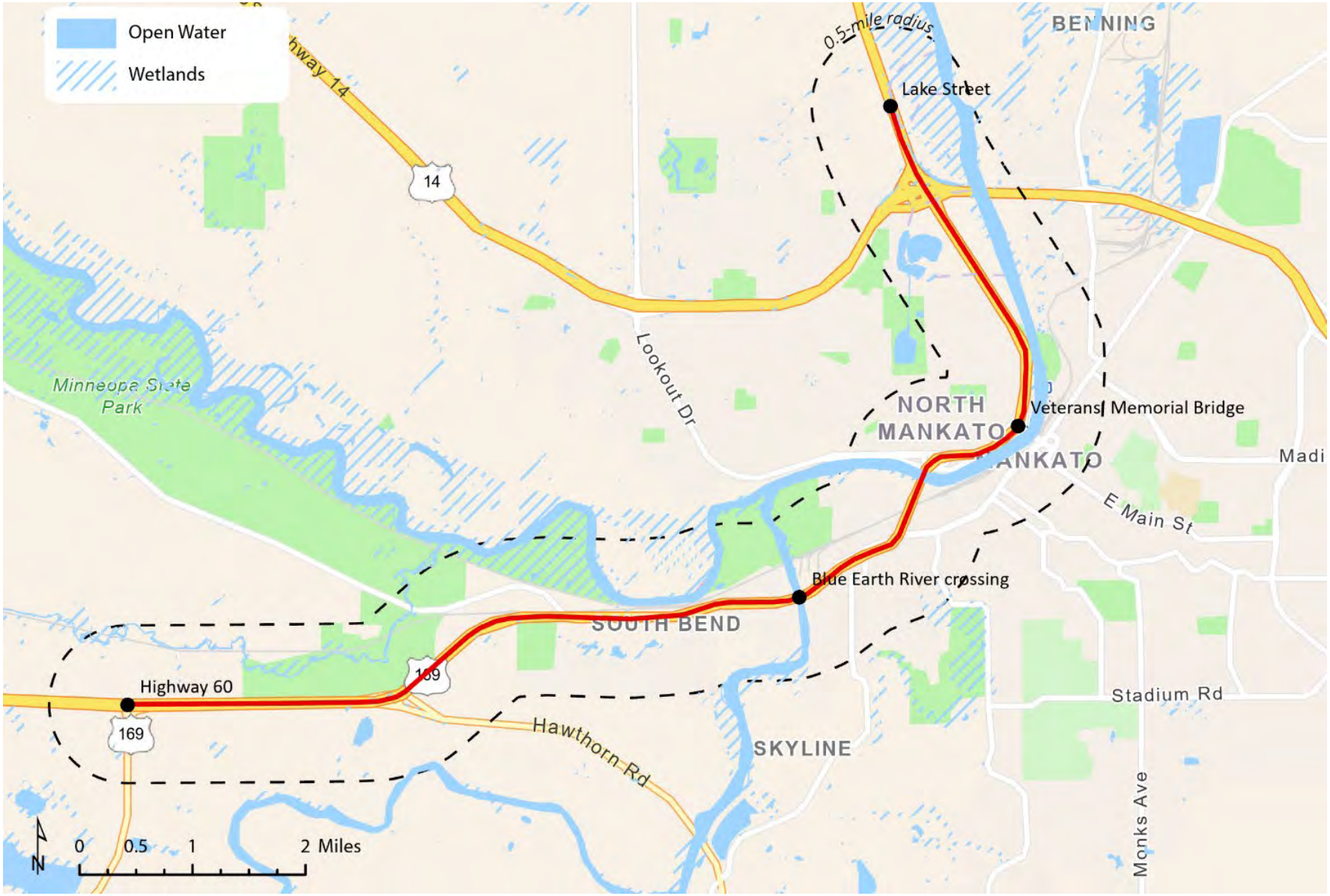


Figure 2: Flood Plains

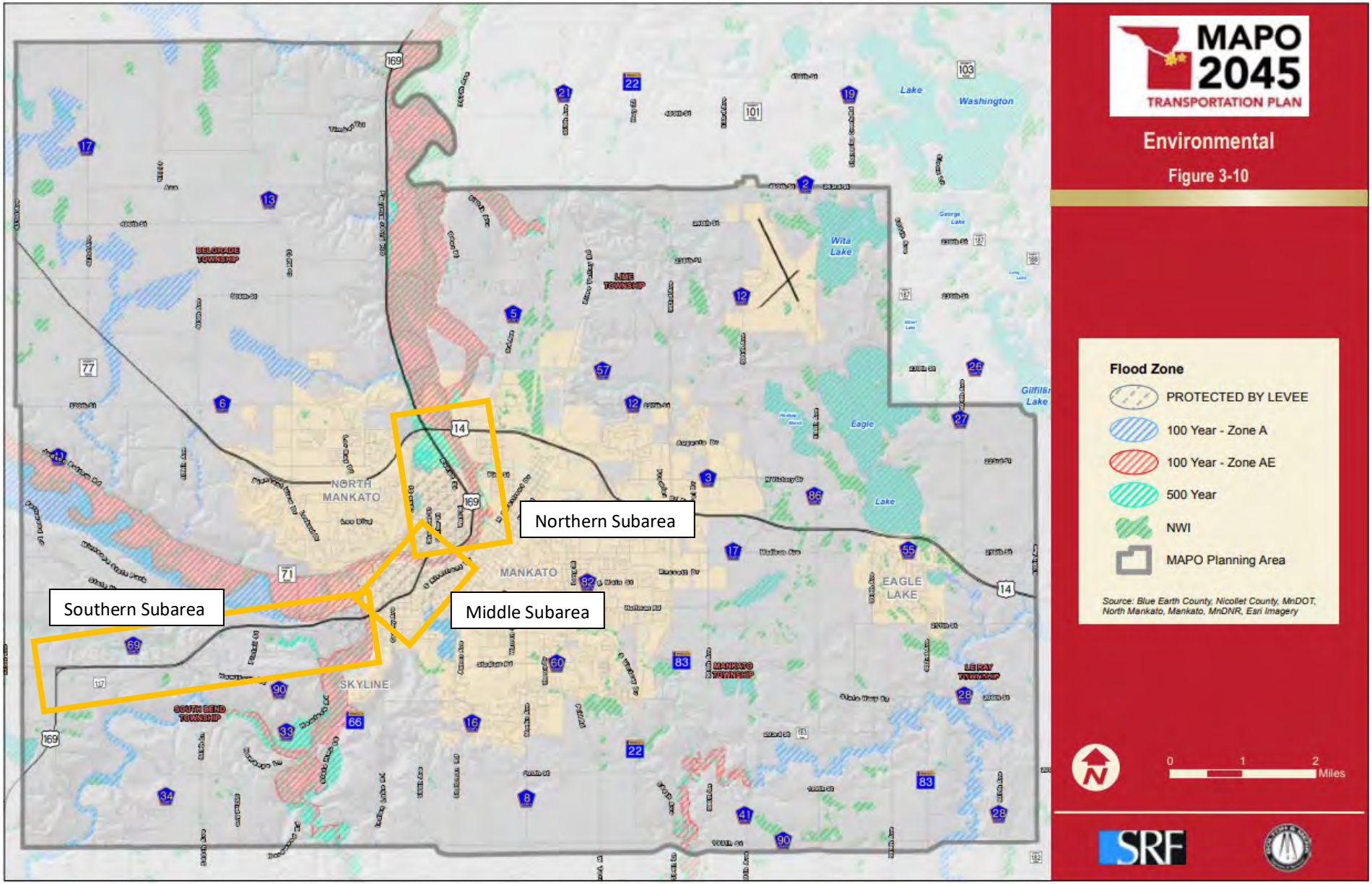


Figure 3: Potentially Contaminated Sites

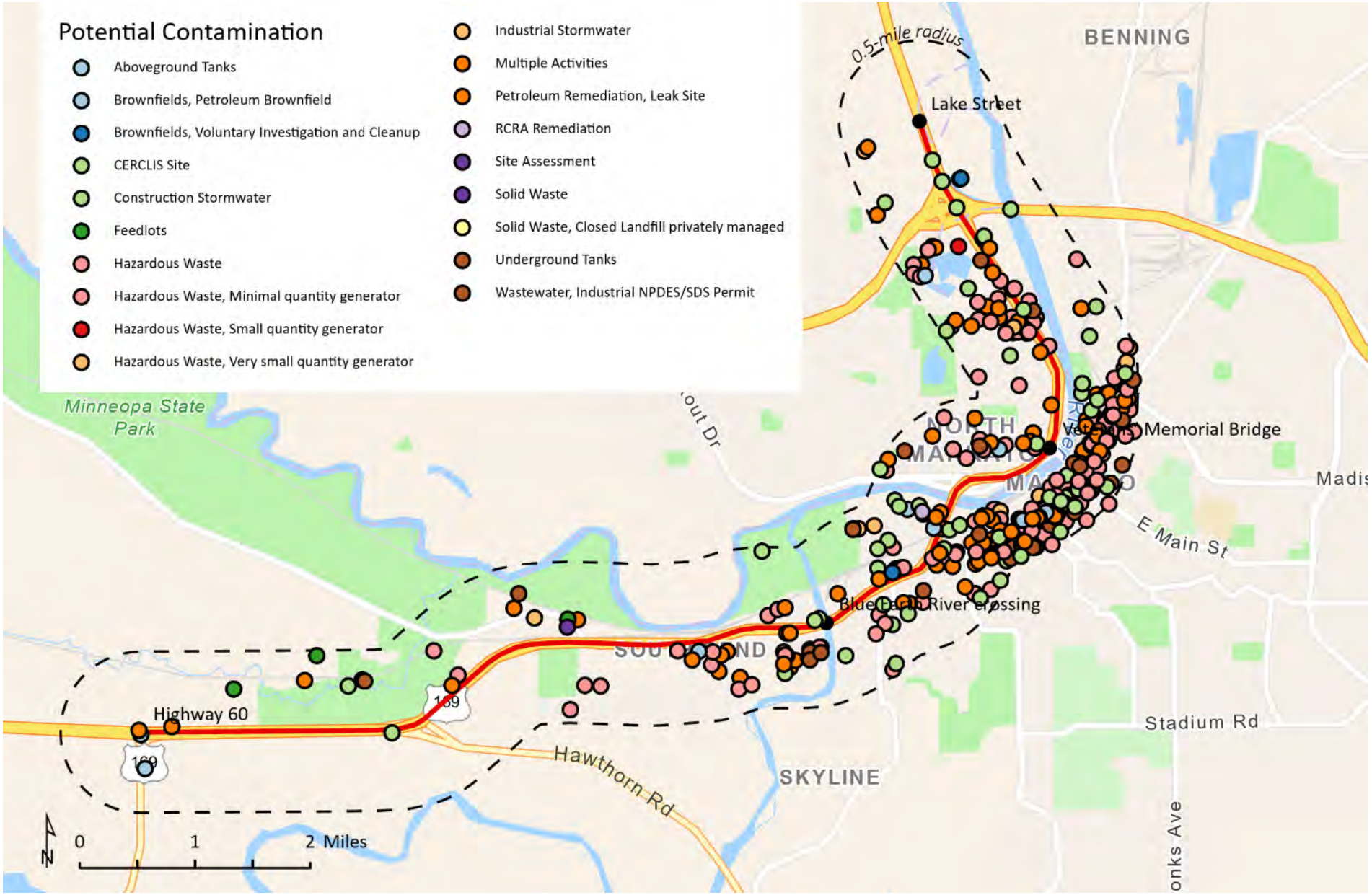


Figure 4: Existing Land Use

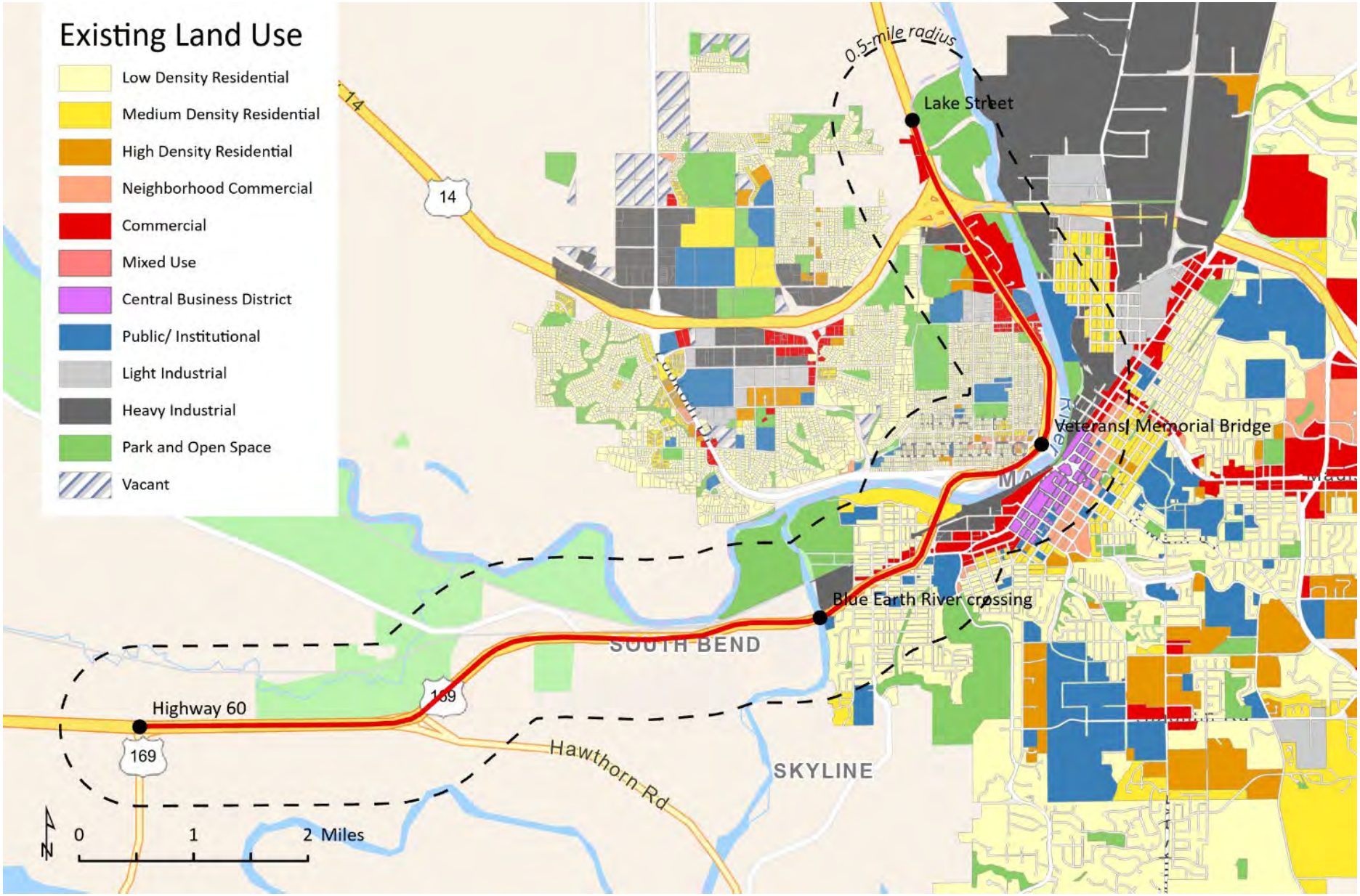


Figure 5: Percent Minority Individuals by Block Group

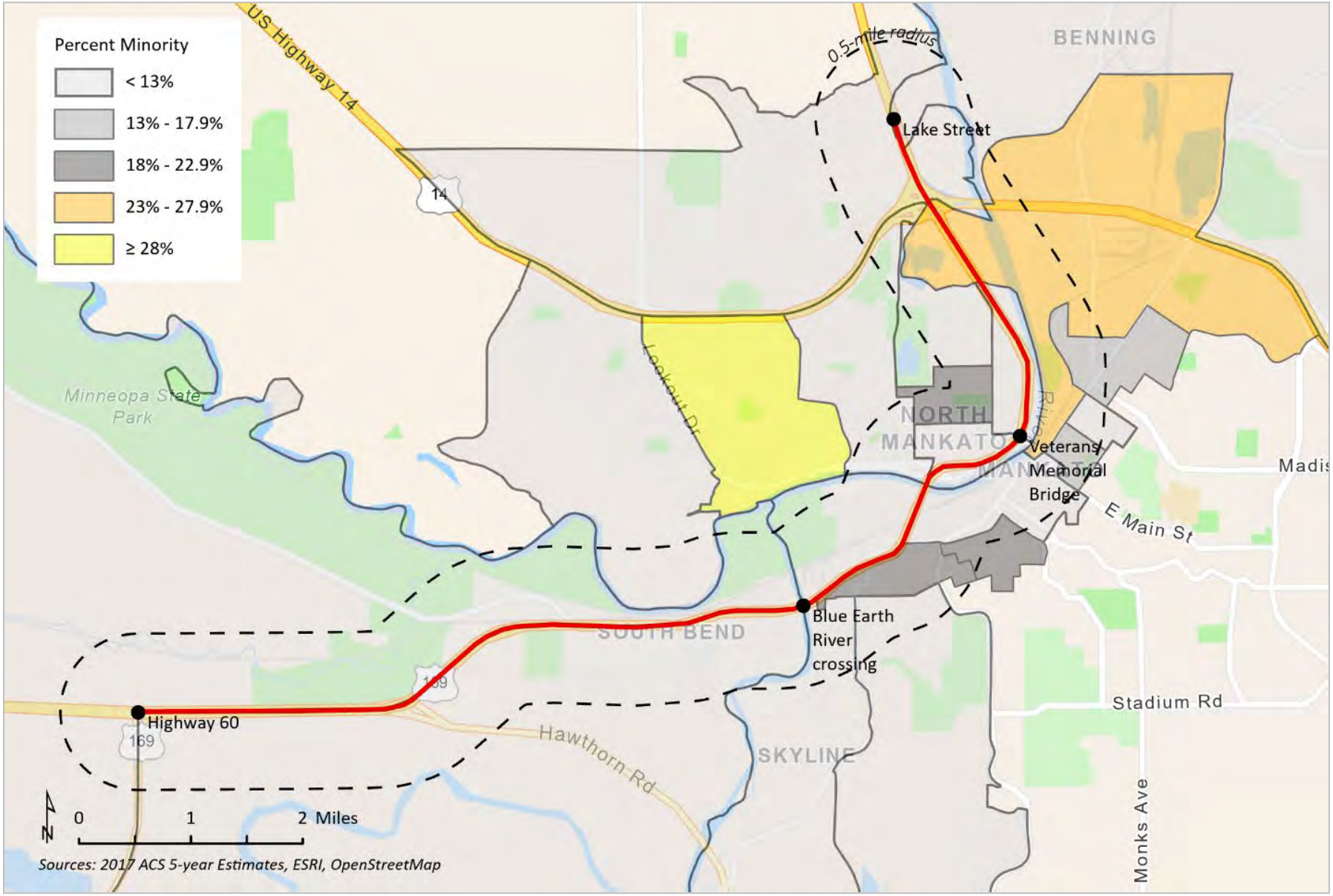
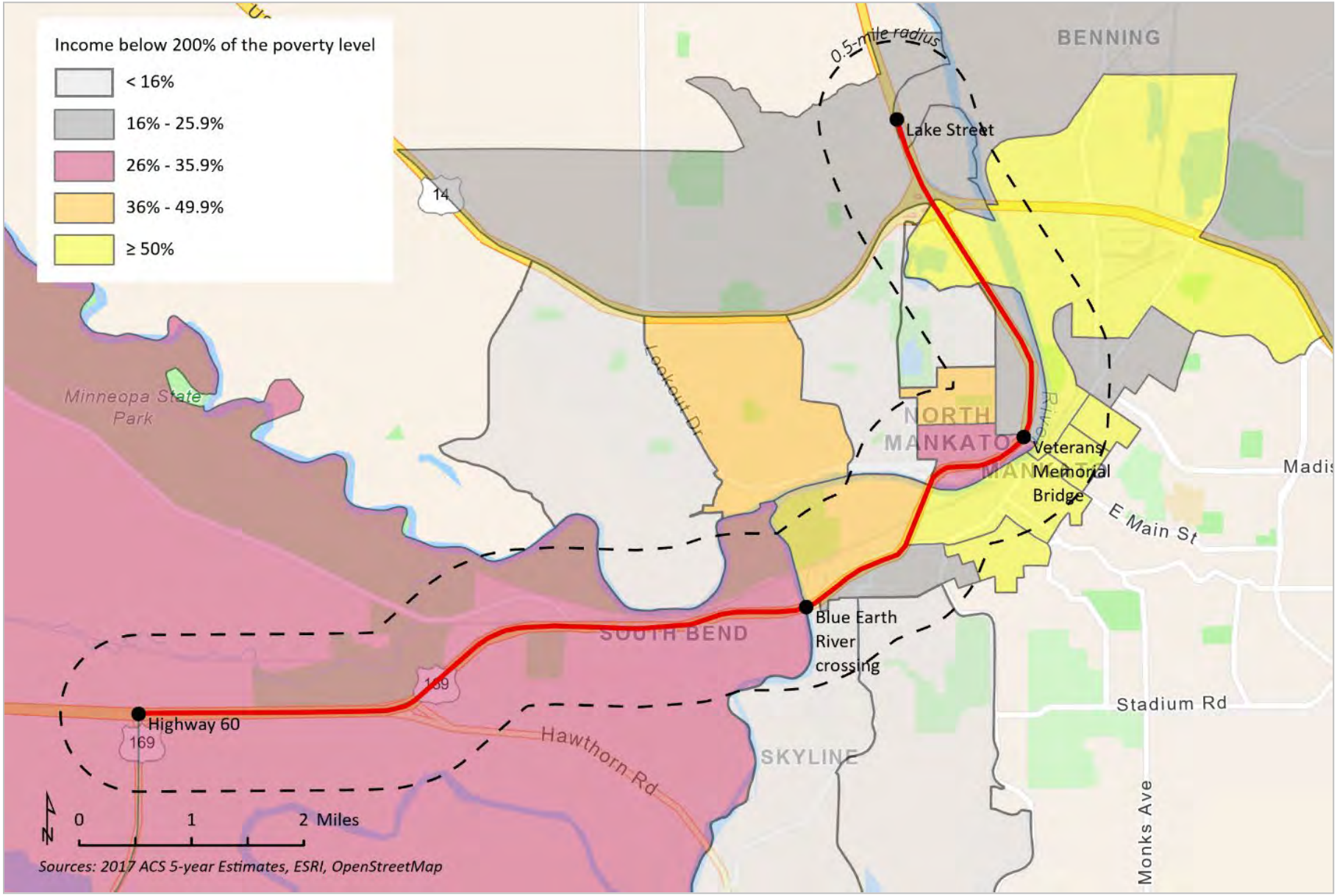


Figure 6: Percent Low-Income Individuals by Block Group



Evaluation Memo Appendix E

DISMISSED CONCEPTS

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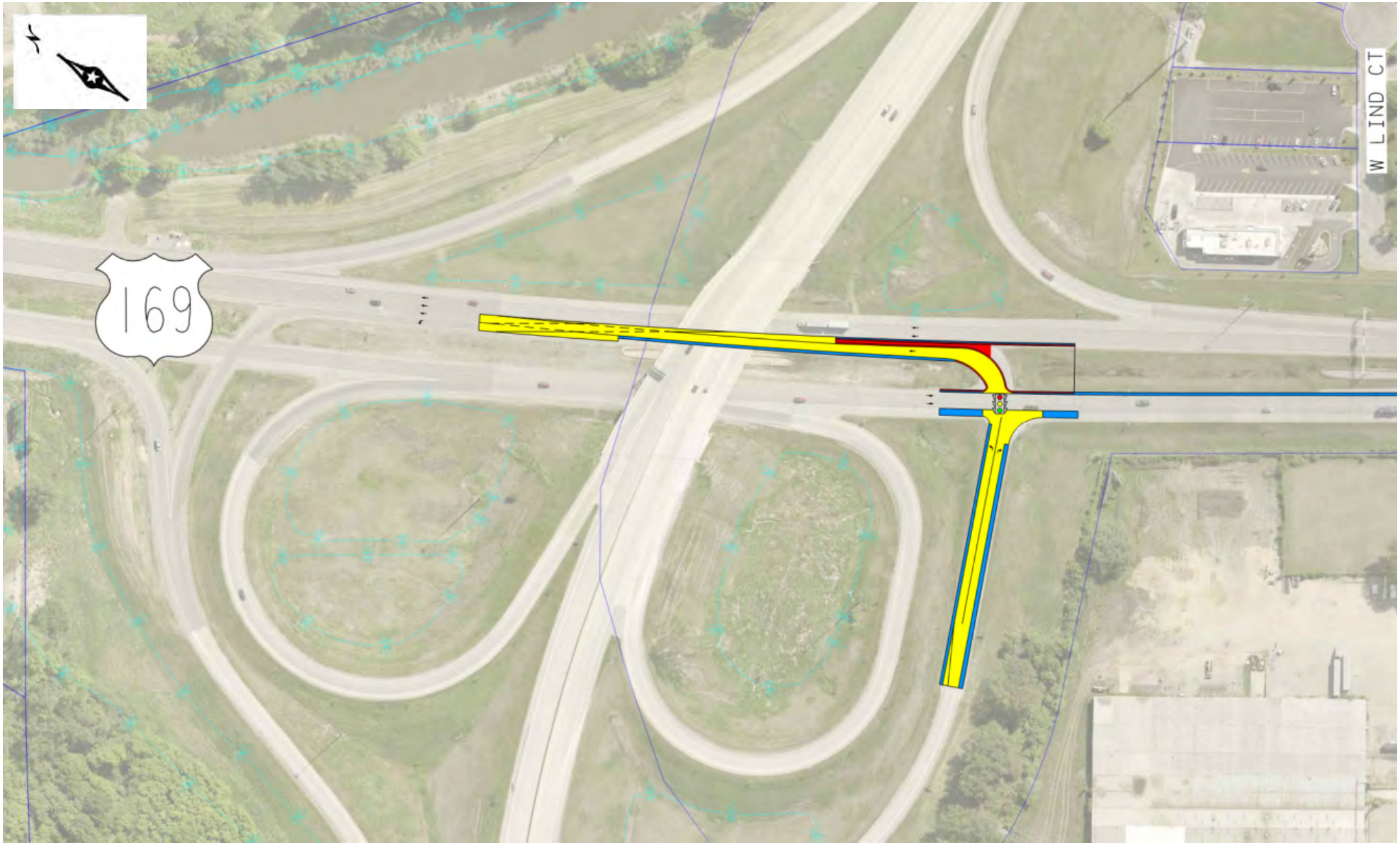
AREA PLANNING ORGANIZATION

Northern Subarea – Dismissed Concepts

Signalized Green T at Eastbound TH 14 Exit Ramp



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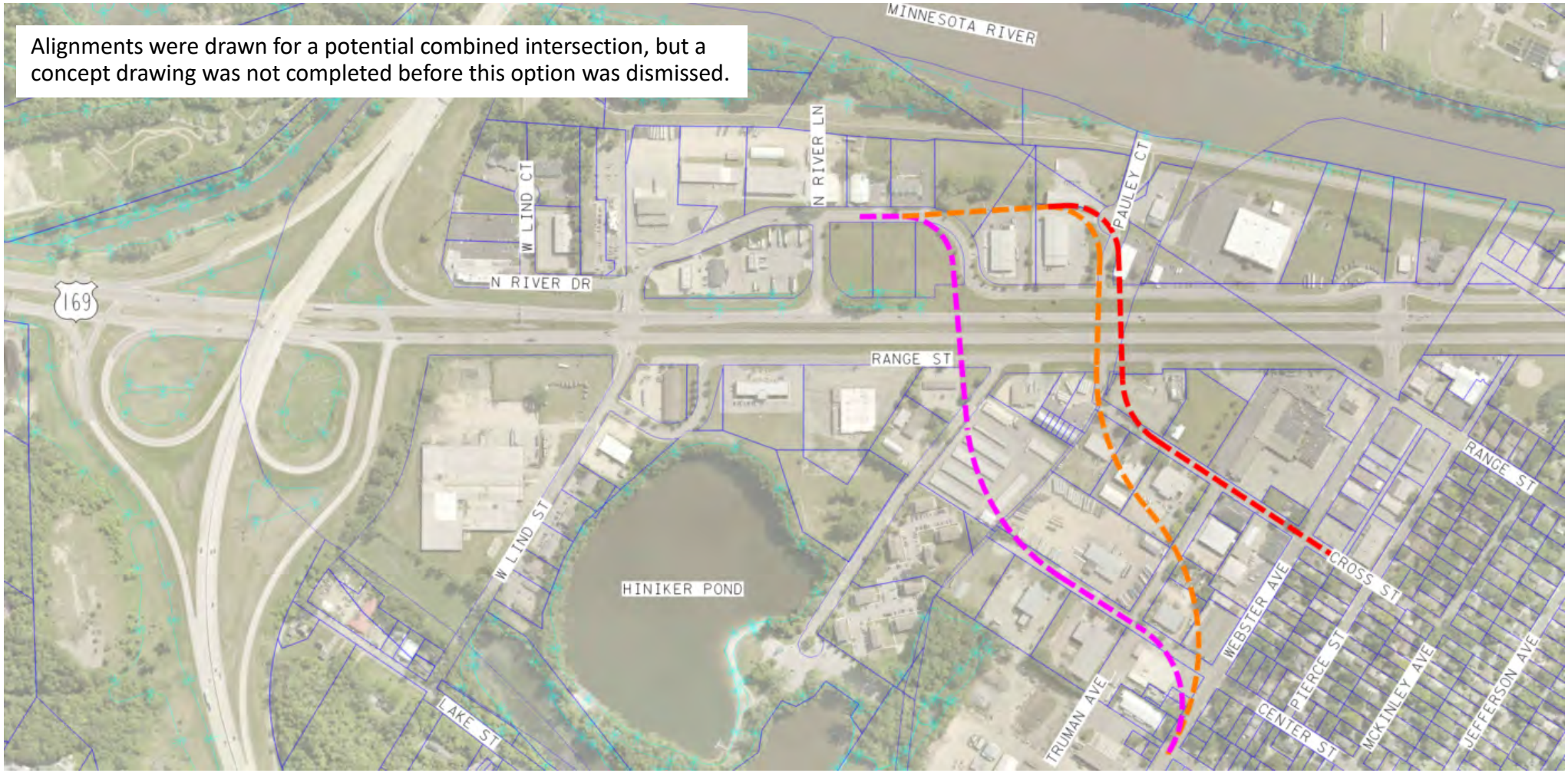
Northern Subarea – Dismissed Concepts

Combined Intersection – Lind Street, River Lane, Webster Avenue



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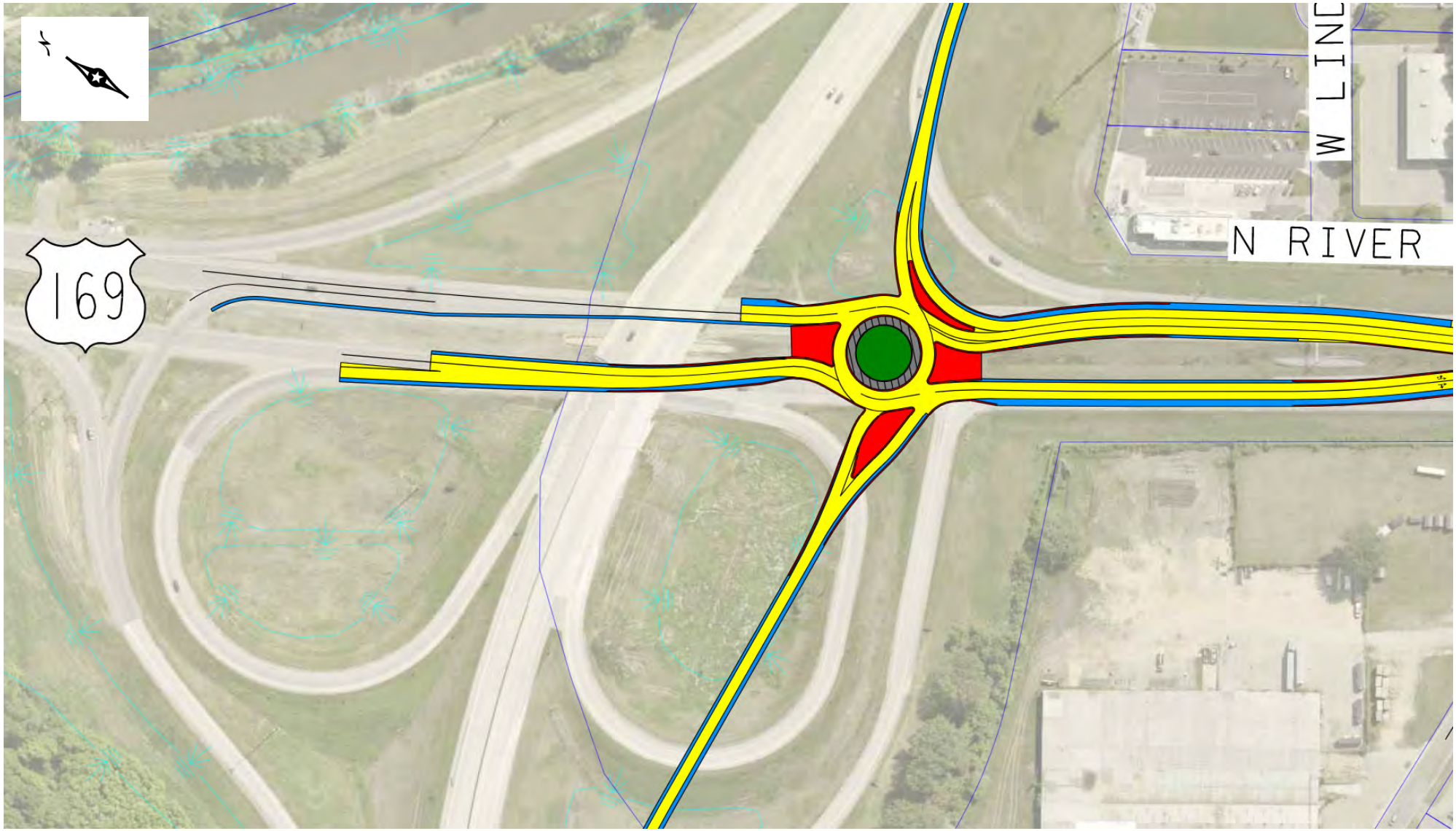
Northern Subarea – Dismissed Concepts

Option 2B – TH 14 Interchange (Eliminate South Loop – Roundabout)



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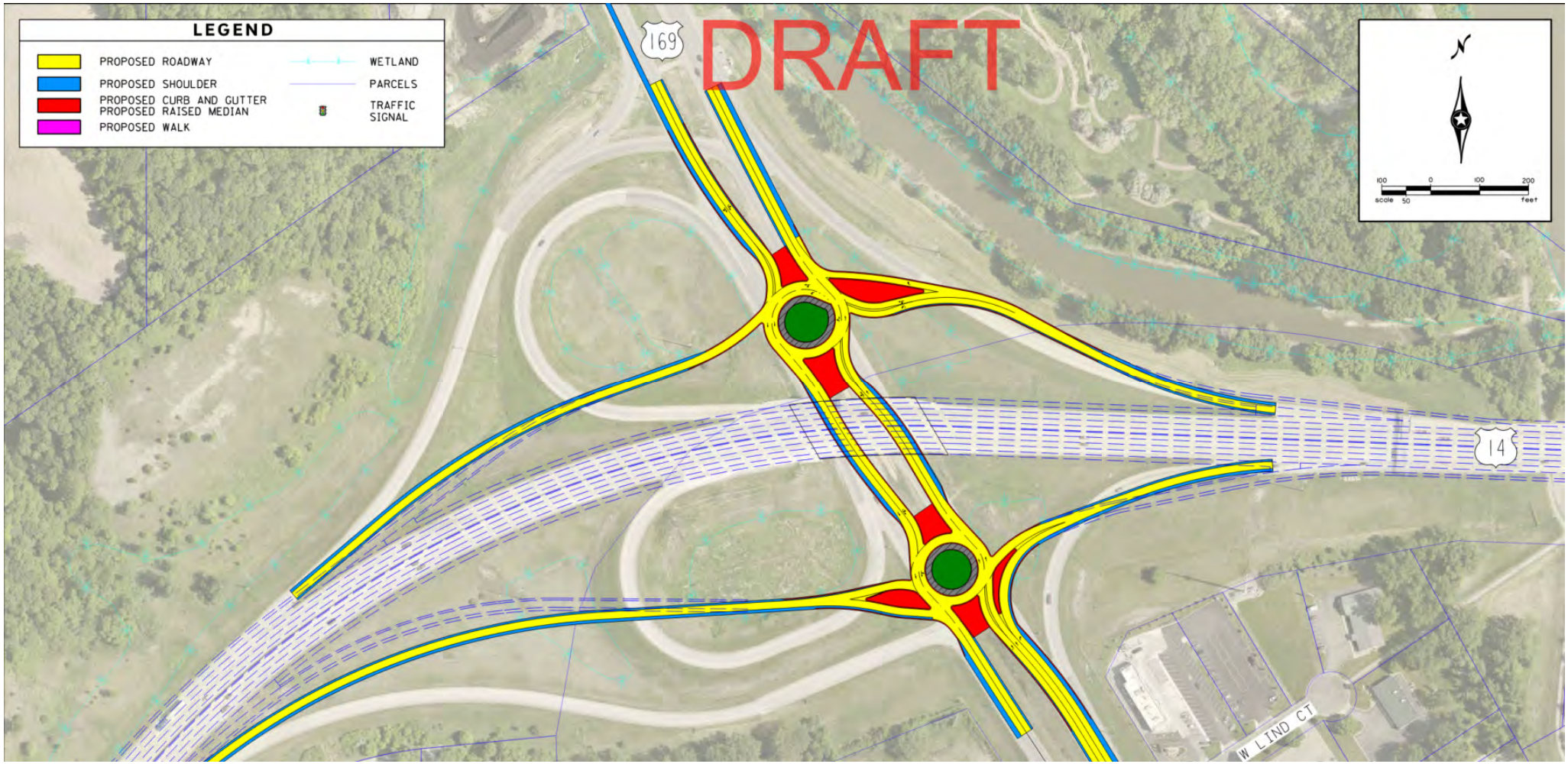
Northern Subarea – Dismissed Concepts

Option 2E – TH 14 Interchange (Roundabout Ramp Intersections)



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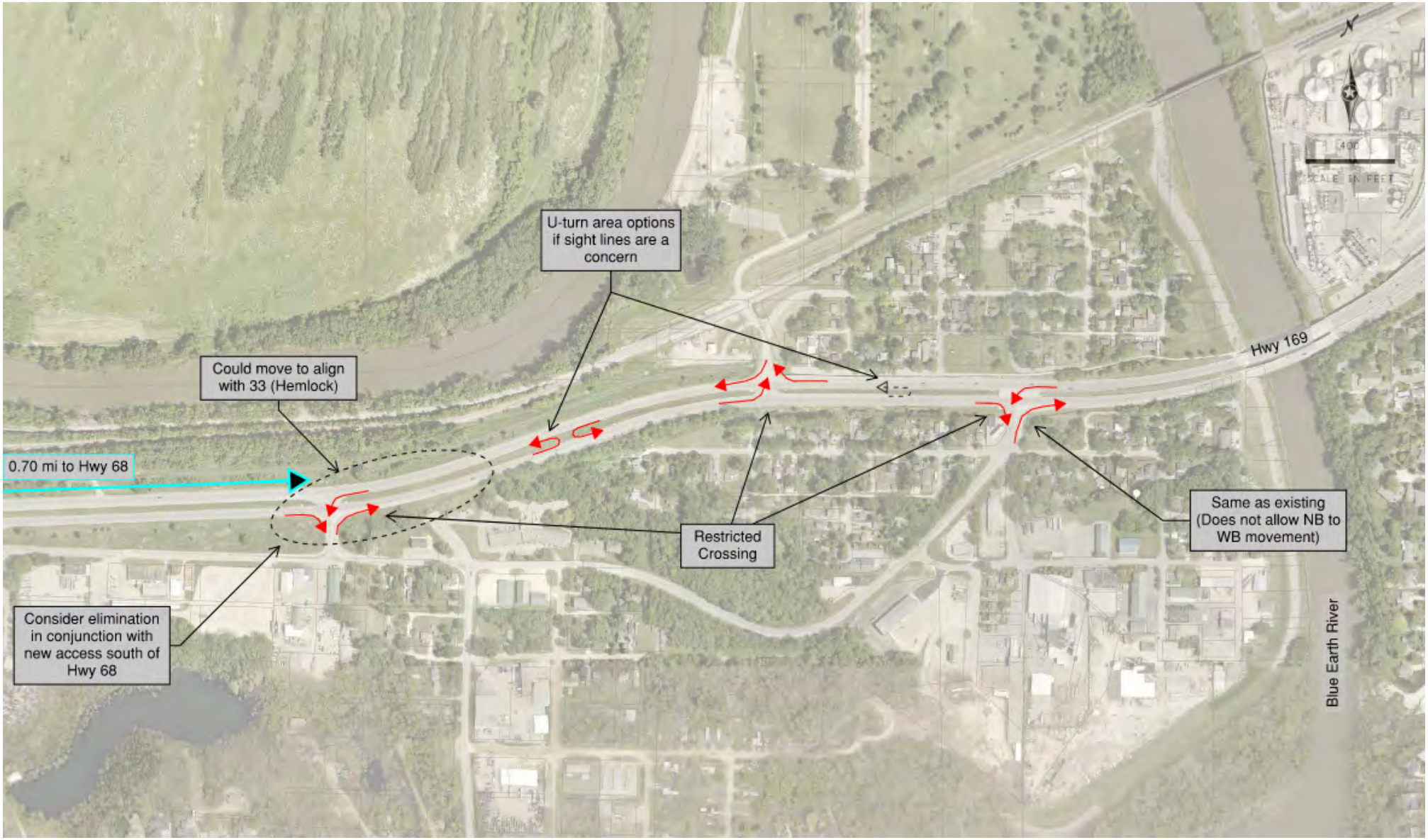
Southern Subarea – Dismissed Concepts

Section 1: Alternative 1A



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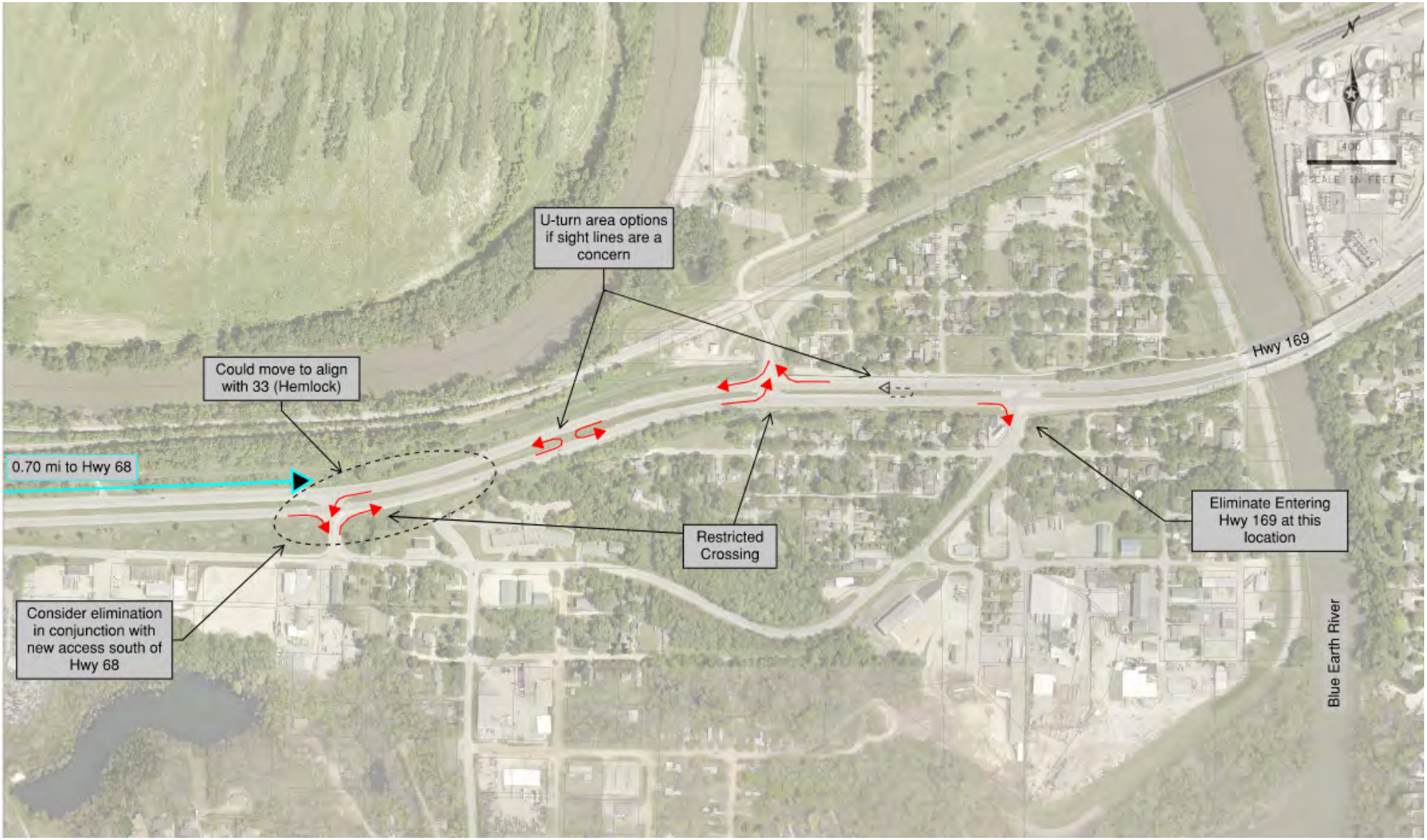
Southern Subarea – Dismissed Concepts

Section 1: Alternative 1B



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Evaluation Memo Appendix F

BENEFIT COST ANALYSIS MEMORANDUM

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AREA PLANNING ORGANIZATION

Highway 169 Corridor Study

Benefit Cost Analysis

Date: August 25, 2021

To: Charles Androsky, Transportation Planner, MAPO

Ronda Allis, PE, MnDOT

From: Scott McBride, PE, Project Manager, Bolton & Menk, Inc.

Kelsey Retherford, PE, Traffic Engineer, Bolton & Menk, Inc.

Subject: Benefit Cost Analysis

Highway 169 Corridor Study

Mankato/North Mankato Area Planning Organization (MAPO)

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Introduction

The Mankato/North Mankato Area Planning Organization (MAPO) in collaboration with the Cities of North Mankato, Mankato, Blue Earth County, Nicollet County, and the Minnesota Department of Transportation (MnDOT) are working to identify transportation improvements on Highway 169. This report summarizes the detailed benefit cost analysis of the Northern Subarea concepts.

Concepts

A benefit cost analysis was completed for the following concepts:

- **Concept 1a – Signalized Expressway:** Signals at combined Lind St/River Ln and Webster Ave intersections
- **Concept 1b – Roundabout Expressway:** Roundabouts at combined Lind St/River Ln and Webster Ave intersections
- **Concept 1c – RCUT Expressway:** Signalized RCUTs (Restricted Crossing U-Turn)at combined Lind St/River Ln and Webster Ave intersections
- **Concept 1d – Freeway:** Interchange at Webster Ave and TH 169, close Lind St/River Ln access
- **Concept 2a – Freeway:** Full cloverleaf interchange at TH 169/TH 14
- **Concept 2c – Spot Interchange Improvements - Expressway:** Eliminate South to East loop and signalize TH 169 at EB TH 14 Ramps
- **Concept 2d – Spot Interchange Improvements - Expressway:** Convert TH 14 at TH 169 to a Diverging Diamond interchange
- **Concept 2f – Spot Interchange Improvements - Expressway:** Signalize TH 169 at EB TH 14 Exit Ramp

Concept drawings are included in the **Appendix**.

Safety Benefit

Lind St/River Ln/Webster Ave Concepts

Crash reduction factors for the alternatives were taken from the Highway Safety Manual, CMF Clearinghouse, and MnDOT technical memos. The reduction factors were used in combination with the standard HSIP Benefit-Cost Calculation worksheets to generate benefits associated with crash reductions. A traffic growth rate of 1.2% was determined comparing the existing and future peak hour turning movement volumes. Additionally, a discount rate of 1.0% and a project lifespan of 20 years was assumed based on MnDOT Benefit-Cost Analysis and HSIP guidance. Crash data from the last 5 years at Lind St, River Ln, and Webster Ave were analyzed for Concepts 1a-1d.

The crash reductions assumed for each concept are described below.

- **Concept 1a – Signalized Expressway:** No crash reduction was assumed since this option does not change the intersection of TH 169 at Webster Ave and only combines Lind St/River Ln traffic at signal which is similar to the existing condition.

- **Concept 1b – Roundabout Expressway:** Crash reductions (and increases) were taken from Table 15 of "A Study of the Traffic Safety at Roundabouts in Minnesota (2017)" which shows percent increase/decreases in crashes by severity for 2x1 roundabouts statewide.
- **Concept 1c – RCUT Expressway:** Crash reductions were taken from the 2017 MnDOT Study of the Traffic Safety at Reduced Conflict Intersections and the MnDOT Tech Memo: Restricted Crossing U-Turn - Design and Implementation Guidance. The reports show a crash reduction of 77% for angle crashes and a 35% reduction for all other crashes.
- **Concept 1d – Freeway (Interchange at Webster):** Crash reductions for converting an at grade intersection into a grade separated interchange was taken from the Highway Safety Manual. The HSM shows a 57% reduction in injury crashes and a 42% reduction in all other crashes. Additionally, CMFs for converting an intersection to a roundabout were applied. CMF ID 9157 was applied to all injury crashes (44% reduction) and CMF ID 10084 was applied to all property damage only crashes (36% reduction)

The present value safety benefits are shown in **Table 1** for the Concepts 1a-1d. The HSIP Benefit-Cost Calculation worksheets used to determine the present value cost of crashes are included in the **Appendix**.

Table 1. Safety Benefits for Lind/River/Webster Concepts

Concepts	Safety Benefit
Concept 1a. Signalized Expressway	$ -
Concept 1b. Roundabout Expressway	$ 386,419
Concept 1c. RCUT Expressway	$ 7,798,000
Concept 1d. Interchange at Webster	$ 14,711,915

TH 14 Interchange Concepts

Applicable crash reduction factors were not available for all of the TH 14 interchange concepts. Therefore, a new approach was used to determine the safety benefit with each concept. First, the conflict points with each concept were analyzed and compared to the existing condition. The following table shows the conflict points and change in conflict points from the existing condition.

Table 2. TH 14 Concept Conflict Points

Concepts	Conflict Points	Change in Conflict Points
No Build/Existing Condition	4 crossing, 8 diverging, 8 merging	N/A
Concept 2a. Full Cloverleaf Interchange	0 crossing, 8 diverging, 8 merging	4 less crossing
Concept 2c. Eliminate South Loop - Signal	6 crossing, 8 diverging, 9 merging	2 more crossing, 1 more merging
Concept 2d. Diverging Diamond	9 crossing, 8 diverging, 9 merging	5 more crossing, 1 more merging
Concept 2f. Signalize EB TH 14 Exit Ramp	4 crossing, 8 diverging, 8 merging	No change

The change in crossing conflict points was used to determine the increase or decrease in angle crashes and the change in merging/diverging conflict points were used to determine the increase or decrease in sideswipe crashes anticipated. The increase/decrease in angle and sideswipe crashes with concept are listed below.

- **Concept 2a – Freeway (Full Cloverleaf):** With 50% fewer crossing conflict points, concept 2a was assumed to have a 50% reduction in angle crashes at the TH 14 interchange.
- **Concept 2c – Spot Interchange Improvements – Expressway (Eliminate South Loop – Signalize):** With 150% more crossing conflict points, concept 2c was assumed to have a 150% increase in angle crashes

at the TH 14 interchange. With 113% more merging conflict points, concept 2c was assumed to have a 113% increase in sideswipe crashes at the TH 14 interchange.

- **Concept 2d – Spot Interchange Improvements – Expressway (Diverging Diamond):** With 225% more crossing conflict points, concept 2d was assumed to have a 225% increase in angle crashes at the TH 14 interchange. With 113% more merging conflict points, concept 2d was assumed to have a 113% increase in sideswipe crashes at the TH 14 interchange.
- **Concept 2f – Spot Interchange Improvements – Expressway (Signalize EB TH 14 Exit Ramp):** With no change in conflict points from the existing scenario, no change in angle or sideswipe crashes were assumed.

The percent reduction/increase was used in combination with the standard HSIP Benefit-Cost Calculation worksheets to generate benefits associated with crash reductions. A traffic growth rate of 1.2% was determined comparing the existing and future peak hour turning movement volumes. Additionally, a discount rate of 1.0% and a project lifespan of 20 years was assumed based on MnDOT Benefit-Cost Analysis and HSIP guidance. Crash data from the last 5 years at the TH 14/TH 149 interchange were analyzed.

The safety benefit due to anticipated changes in angle and sideswipe crashes is shown in **Table 3** below. Values in parenthesis indicate a negative safety benefit (increase in crashes).

Table 3. Safety Benefits (Angle and Sideswipe Crashes) for TH 14 Concepts

Concepts	Safety Benefit
Concept 2a. Full Cloverleaf Interchange	$ 2,458,951
Concept 2c. Eliminate South Loop - Signal	$ (7,516,981)
Concept 2d. Diverging Diamond	$ (1,220,407)
Concept 2f. Signalize EB TH 14 Exit Ramp	$ -

The existing TH 14/TH 169 interchange design results in very few rear end crashes (two in the last five years along the eastbound TH 14 exit ramp, and one along the WB TH 14 to SB TH 169 weave area), therefore, crash data at TH 169 and Lind St was used as a comparison. In order to estimate the increase in rear end crashes with the signalized concepts average 2040 AM/PM mainline delay was compared to 2040 AM/PM mainline delay at Lind St under the no build condition. The average 2040 AM/PM mainline delay with each concept and percent decrease in delay is shown in **Table 4** below. Since all of the concepts show less mainline delay than currently at Lind St, less rear end crashes are anticipated with each of the concepts than are at Lind St today.

Table 4. Average Mainline TH 169 2040 Peak Hour Delay

Concepts	Average Delay (seconds/vehicle)	Percent Decrease in Delay
No Build/Existing Condition (Lind St)	20	N/A
Concept 2c. Eliminate South Loop - Signal	8	60%
Concept 2d. Diverging Diamond	5	75%
Concept 2f. Signalize EB TH 14 Exit Ramp	2.5	88%

To determine the cost of the increase in rear end crashes anticipated with each concept first the present value of rear end crashes at Lind St was calculated. This cost was found to be $10,663,593. Next the cost of rear end crashes reduced with each concept was calculated based on the percent decrease anticipated in delay since delay was assumed to be directly correlated to the number of rear end crashes. Finally, the cost of the rear end crashes that remaining with each option was determined by subtracting the cost of the reduction in rear end crashes from the cost of rear end crashes at Lind St.

HSIP Benefit-Cost Calculation worksheets were used to determine the present value cost of crashes and are included in the **Appendix**.

The safety benefit due to anticipated increase in rear end crashes is shown in **Table 5**.

Table 5. Safety Benefits (Rear End Crashes) for TH 14 Concepts

Concepts	Safety Benefit
Concept 2a. Full Cloverleaf Interchange	$ -
Concept 2c. Eliminate South Loop - Signal	$ (4,265,437)
Concept 2d. Diverging Diamond	$ (2,665,898)
Concept 2f. Signalize EB TH 14 Exit Ramp	$ (1,279,631)

The overall total safety benefit with each option is shown in **Table 6** below.

Table 6. Total Safety Benefits for TH 14 Concepts

Concepts	Safety Benefit
Concept 2a. Full Cloverleaf Interchange	$ 2,458,951
Concept 2c. Eliminate South Loop - Signal	$ (11,782,418)
Concept 2d. Diverging Diamond	$ (3,886,305)
Concept 2f. Signalize EB TH 14 Exit Ramp	$ (1,279,631)

Delay Benefit

Existing and forecasting turning movement counts were used to model peak hour conditions with each concept. Total network delay in hours was determined in Synchro/SimTraffic for the AM and PM peak hours for each concept to determine the delay benefits. Concept 1d was modeled assuming single lane roundabouts at the interchange ramp terminals.

Tables 7 and **8** shows the 2020 and 2040 total network delay for each concept.

Table 7. Total Peak Hour Network Delay for the Lind/River/Webster Concepts

Concepts	2020 Network Delay (Hours)		2040 Network Delay (Hours)	
	AM Peak	PM Peak	AM Peak	PM Peak
No Build/Existing Condition	27.2	34.3	44.3	57.1
Concept 1a. Signalized Expressway	32.5	42.4	47.3	59.6
Concept 1b. Roundabout Expressway	15.3	17.9	39.6	52.1
Concept 1c. RCUT Expressway	26.8	44.0	47.6	70.9
Concept 1d. Interchange at Webster	4.5	6.3	12.8	14.2

Table 8. Total Peak Hour Network Delay for the TH 14 Concepts

Concepts	2020 Network Delay (Hours)		2040 Network Delay (Hours)	
	AM Peak	PM Peak	AM Peak	PM Peak
No Build/Existing Condition	10.3	14.8	70.8	105.3
Concept 2a. Full Cloverleaf Interchange	9.0	13.2	17.1	28.9
Concept 2c. Eliminate South Loop - Signal	22.0	27.6	36.7	48.1
Concept 2d. Diverging Diamond	25.6	29.7	36.6	48.9
Concept 2f. Signalize EB TH 14 Exit Ramp	12.6	16.7	22.6	32.7

Table 7 indicates that concepts 1b and 1d would lower the total network delay compared to the existing condition during the 2020 and 2040 peak hours, where concepts 1a and 1c would increase network delay compared to the no build scenario. **Table 8** indicates that all TH 14 concepts except concept 2a would increase total network delay compared to the existing condition during the 2020 peak hour. However, during the 2040 peak hours the no build scenario delay is anticipated to be significantly worse so by 2040 all concepts are assumed to operate with less delay than the no build scenario.

The AM peak hour was assumed to account for 8% of the daily total and the PM peak hour was assumed to account for 10% of the daily total. Therefore, the total daily delay was estimated using the following equation.

$$\boldsymbol{Total\ Daily\ Delay} = \frac{\boldsymbol{AM\ Network\ Delay} + \boldsymbol{PM\ Network\ Delay}}{(\mathbf{0.08}+\mathbf{0.10})}$$

Auto delay and truck delay values were computed using the truck percentage (6.6%). The 6.6% truck percentage was estimated from the most recent heavy commercial count along TH 169 south of TH 14. The following values of travel time savings per person-hour were taken from Table A.1 of MnDOTs recommended standard values for use in cost effectiveness and benefit-cost analysis:

- $20.30 for autos
- $33.00 for trucks

Benefits from the reduction of delay were computed for the various concepts by comparing the total delay values for the concepts to the no build scenario. The total benefit over the 20-year analysis period can be determined using the 2020 and 2040 benefits. Assuming the delay benefits increased over the analysis period with a discount rate of 1.0%, the following formula was used to convert to a present value total delay benefit:

$$\boldsymbol{Total\ Delay\ Benefit} =$$

$$(\mathbf{2020}\ \boldsymbol{Benefit}) + \mathbf{17.2} * (\mathbf{2020}\ \boldsymbol{Benefit}) + \mathbf{150} * \frac{(\mathbf{2040}\ \boldsymbol{Benefit} - \mathbf{2020}\ \boldsymbol{Benefit})}{\mathbf{19}}$$

The formula was developed by assuming a uniform series of the 2020 benefit over the 20-year analysis period with the addition of a uniform gradient benefit (the additional benefit gained every year until the full 2040 benefit is reached). See **Tables 9** and **10** for the total delay benefits for each concept.

Table 9. Delay Benefits for Lind/River/Webster Concepts

Concepts	Delay Benefit
Concept 1a. Signalized Expressway	$ (9,762,231)
Concept 1b. Roundabout Expressway	$ 19,284,962
Concept 1c. RCUT Expressway	$ (16,013,057)
Concept 1d. Interchange at Webster	$ 74,206,498

Table 10. Delay Benefits for TH 14 Concepts

Concepts	Delay Benefit
Concept 2a. Full Cloverleaf Interchange	$ 91,765,194
Concept 2c. Eliminate South Loop - Signal	$ 52,640,901
Concept 2d. Diverging Diamond	$ 49,628,565
Concept 2f. Signalize EB TH 14 Exit Ramp	$ 82,151,540

Delay benefits for the concepts 1a and 1c were found to be negative as delay is increased overall with these options.

Project Cost

Planning level cost estimates were calculated for each alternative. The cost estimates shown are in 2022 dollars and include 20% contingency and 20% for design and construction engineering fees. The cost of right of way was included only for concepts that require full property takes as concepts drawings were completed at a planning level and exact property impacts is unknown. Only concepts 1d and 2a were assumed to have full property takes based on the planning level concepts. The cost of acquiring the properties was assumed to be three times the current market value of the property. For concept 1d, six of the properties adjacent to the existing TH 169 and Webster Ave intersection were assumed to be acquired. For concept 2a, only one property was assumed to be acquired. The impacted properties can be seen on the concept figure for concept 2a and 1d in **Appendix B**. The construction and right of way acquisition costs are shown in **Table 11** below. A lower and higher end cost is shown for concept 2a. The lower end cost assumes the interchange remains within the flood zone (which is the existing condition). The higher end cost raises TH 169 and the TH 14 interchange to eliminate the flood zone issue so that TH 169 does not need to be closed and sand bagged when the Mississippi River water levels get too high.

Table 11. Concept Cost Estimates

Concepts	Construction Cost	ROW Cost	Total Cost
Concept 1a. Signalized Expressway	$ 6,200,000	$ -	$ 6,200,000
Concept 1b. Roundabout Expressway	$ 7,300,000	$ -	$ 7,300,000
Concept 1c. RCUT Expressway	$ 8,600,000	$ -	$ 8,600,000
Concept 1d. Interchange at Webster	$ 25,000,000	$ 4,430,700	$ 29,431,000
Concept 2a. Full Cloverleaf Interchange (lower end)	$ 14,000,000	$ 3,078,300	$ 17,079,000
Concept 2a. Full Cloverleaf Interchange (higher end)	$ 23,000,000	$ 3,078,300	$ 26,079,000
Concept 2c. Eliminate South Loop - Signal	$ 2,500,000	$ -	$ 2,500,000
Concept 2d. Diverging Diamond	$ 9,000,000	$ -	$ 9,000,000
Concept 2f. Signalize EB TH 14 Exit Ramp	$ 500,000	$ -	$ 500,000

Cost Benefit Summary

The present value of both safety and delay benefits are summarized in **Tables 12** and **13** along with concept-level cost estimates and the benefit to cost ratio. A ratio greater than one indicates the project cost is less than the anticipated benefit from the investment. A ratio lower than one, or a negative ratio, indicates the anticipated benefit does not offset the cost.

Table 12. Benefit-Cost for Lind/River/Webster Concepts

Concepts	Safety Benefit	Delay Benefit	Total Cost	B/C Ratio
Concept 1a. Signalized Expressway	$ -	$ (9,762,231)	$ 3,700,000	**-2.64**
Concept 1b. Roundabout Expressway	$ 386,419	$ 19,284,962	$ 7,300,000	**2.69**
Concept 1c. RCUT Expressway	$ 7,798,000	$ (16,013,057)	$ 8,600,000	**-0.96**
Concept 1d. Interchange at Webster	$ 14,711,915	$ 74,206,498	$ 29,431,000	**3.02**

Table 12 indicates that concepts 1b and 1d both have anticipated benefits that are higher than project costs. Since concepts 1a and 1c have benefit cost ratios less than one, the anticipated benefits do not offset the cost.

Table 13. Benefit-Cost for TH 14 Concepts

Concepts	Safety Benefit	Delay Benefit	Total Cost	B/C Ratio
Concept 2a. Full Cloverleaf Interchange (lower end)	$ 2,458,951	$ 91,765,194	$ 17,079,000	**5.52**
Concept 2a. Full Cloverleaf Interchange (higher end)	$ 2,458,951	$ 91,765,194	$ 26,079,000	**3.61**
Concept 2c. Eliminate South Loop - Signal	$ (11,782,418)	$ 52,640,901	$ 2,500,000	**16.34**
Concept 2d. Diverging Diamond	$ (3,886,305)	$ 49,628,565	$ 9,000,000	**5.08**
Concept 2f. Signalize EB TH 14 Exit Ramp	$ (1,279,631)	$ 82,151,540	$ 500,000	**161.74**

Table 13 indicates that all of the TH 14 concepts have anticipated benefits that are higher than the project costs.

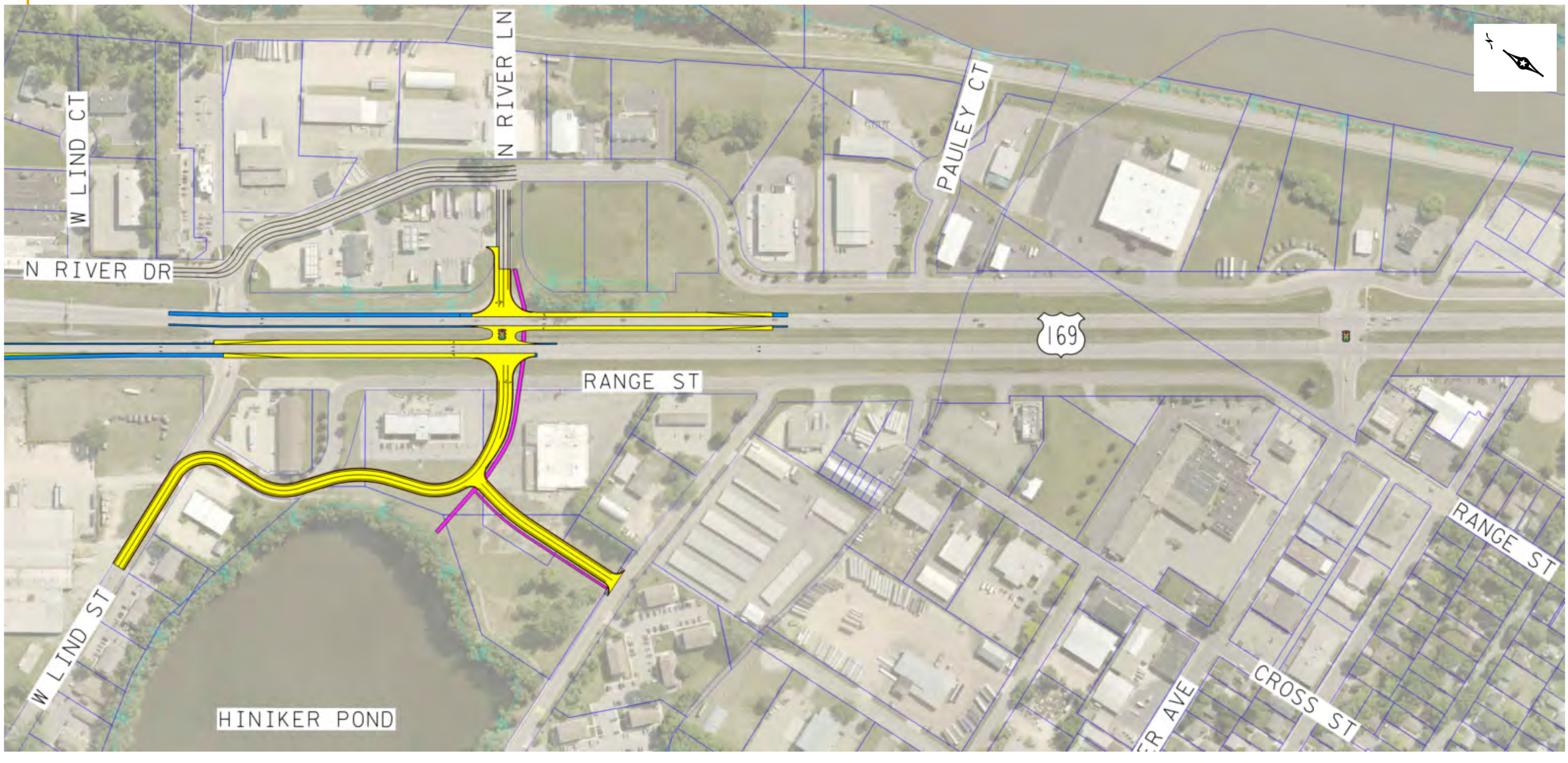
BCA Memo Appendix

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

BOLTON & MENK
Real People. Real Solutions.

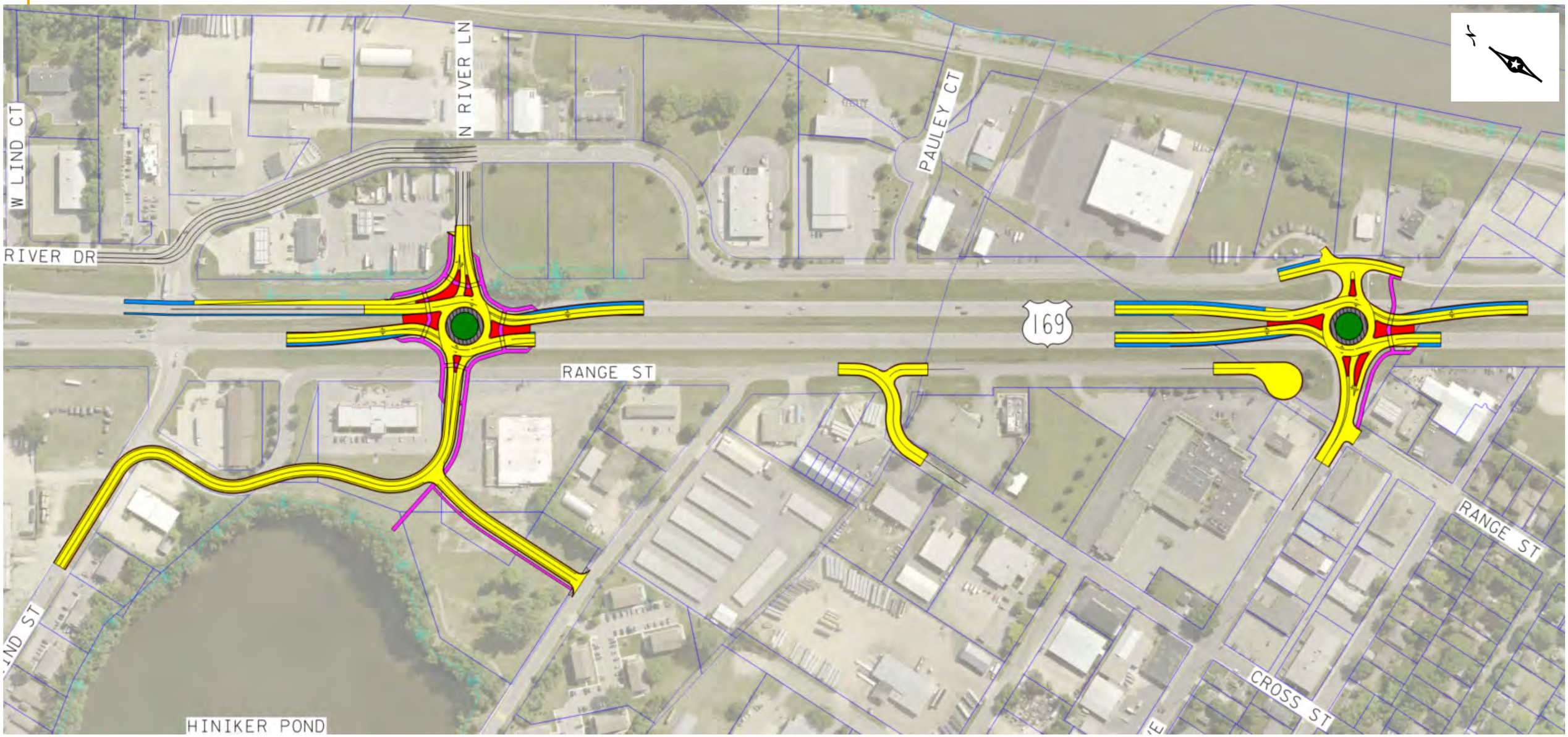
Northern Subarea – N River Ln and Webster Ave

Concept 1A – N River Ln and Webster Ave: Traffic Signal



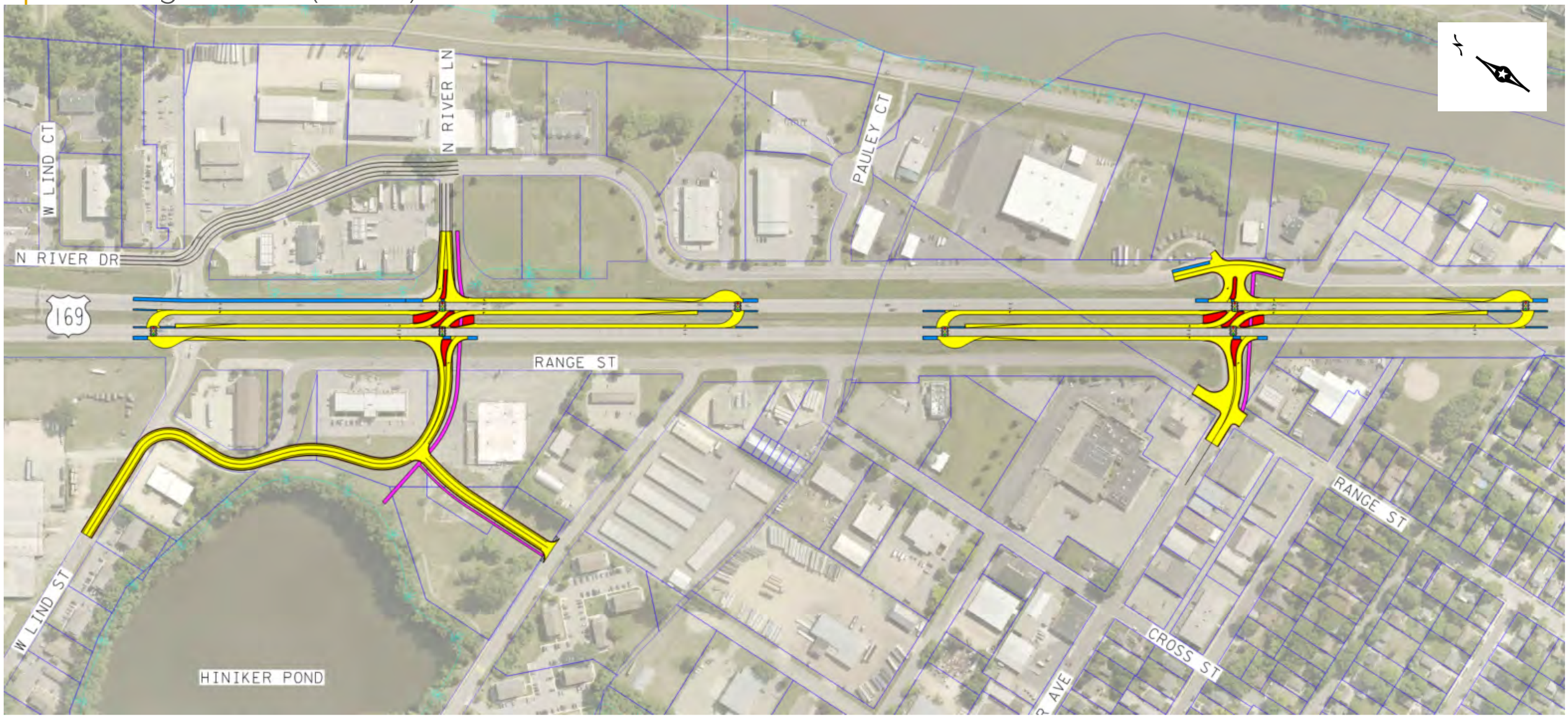
Northern Subarea – N River Ln and Webster Ave

Concept 1B – N River Ln and Webster Ave: Roundabouts



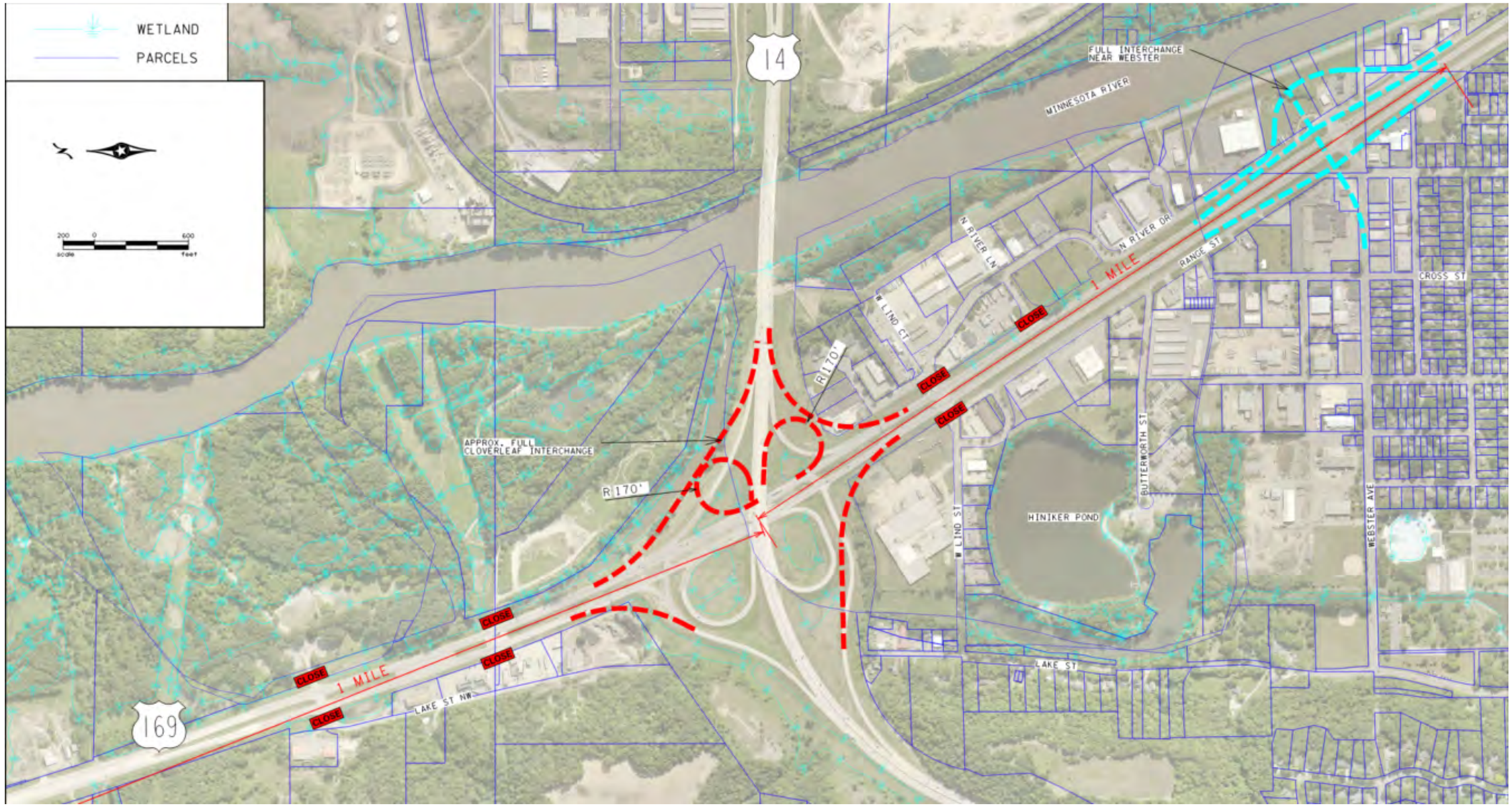
Northern Subarea – N River Ln and Webster Ave

Concept 1C – N River Ln and Webster Ave: Restricted Crossing U-Turn (RCUT) Intersections



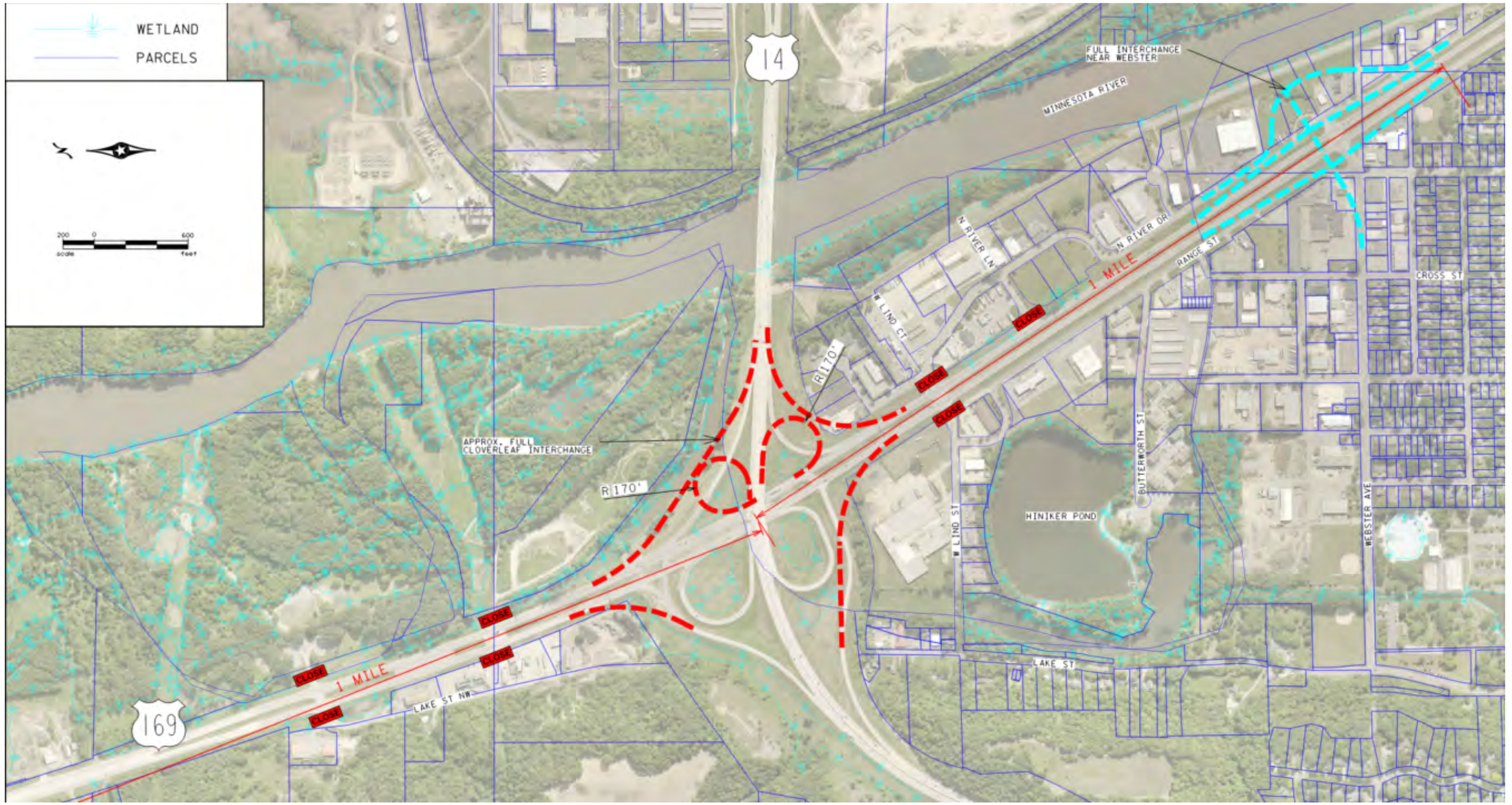
Northern Subarea – Freeway Option

Concept 1D – Hwy 169/14 Cloverleaf and Webster Ave Interchange



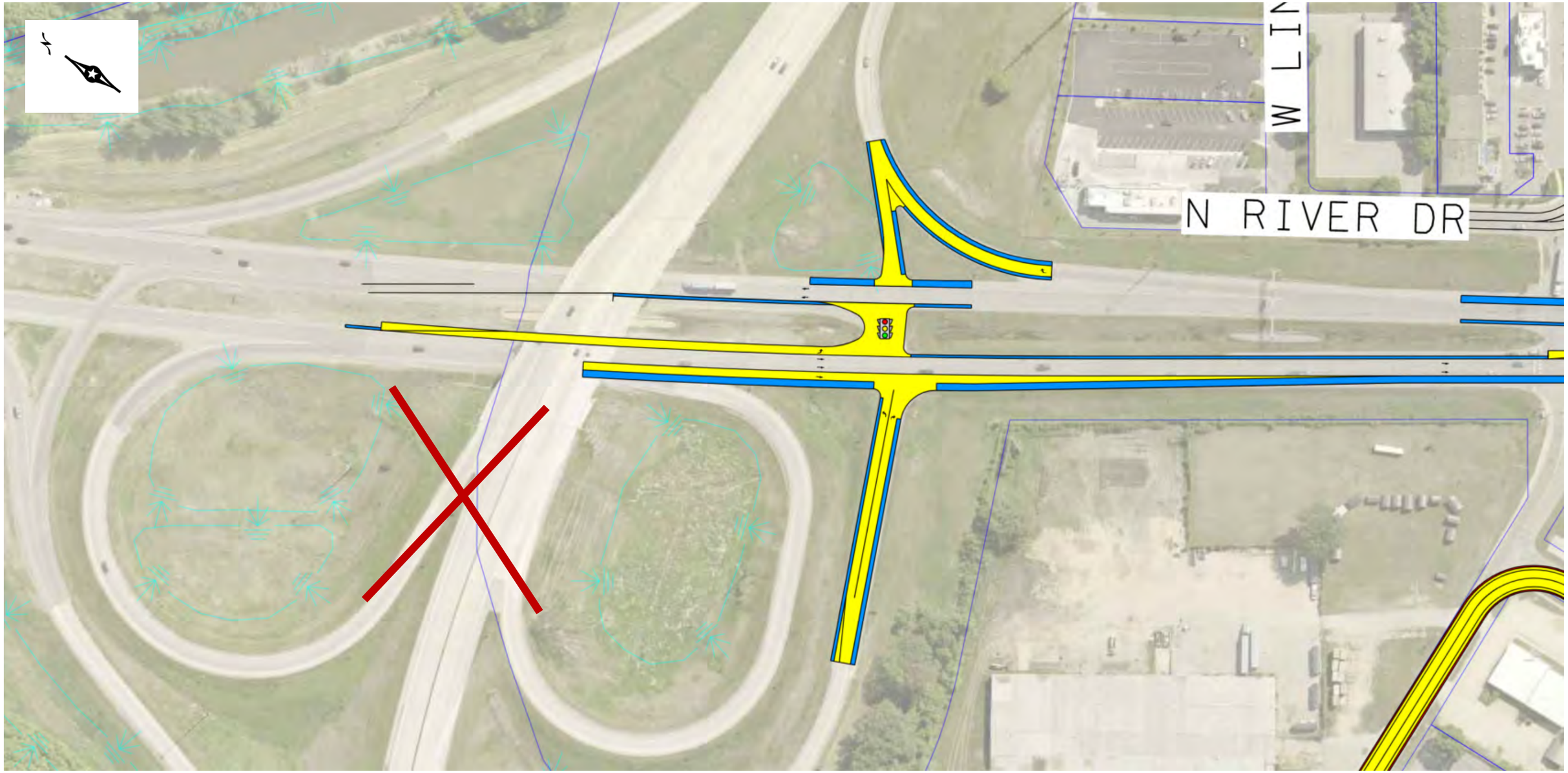
Northern Subarea – Hwy 14 Interchange

Concept 2A: Full Cloverleaf



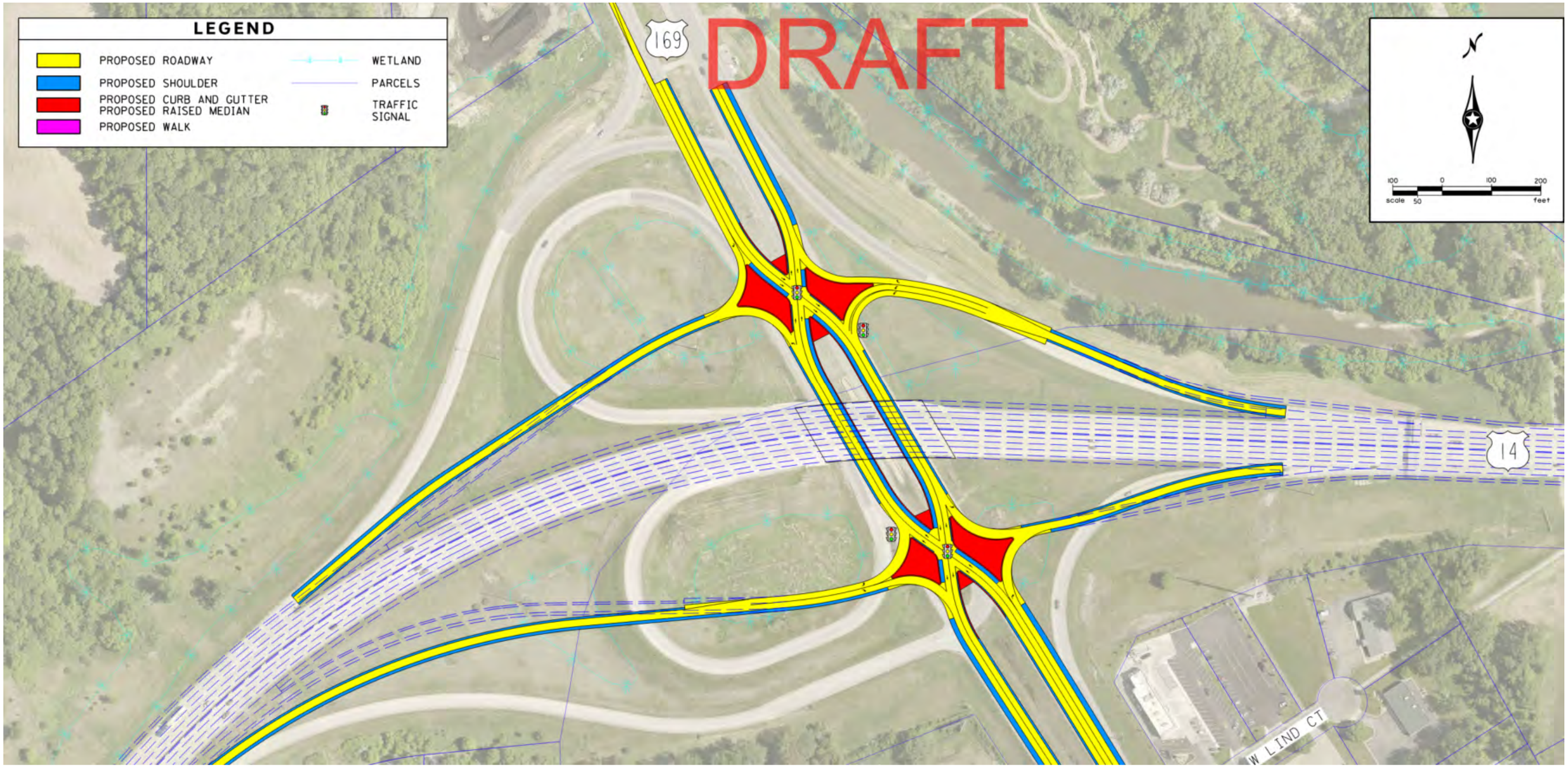
Northern Subarea – Hwy 14 Interchange

Concept 2C: Eliminate South Loop and Add Traffic Signal



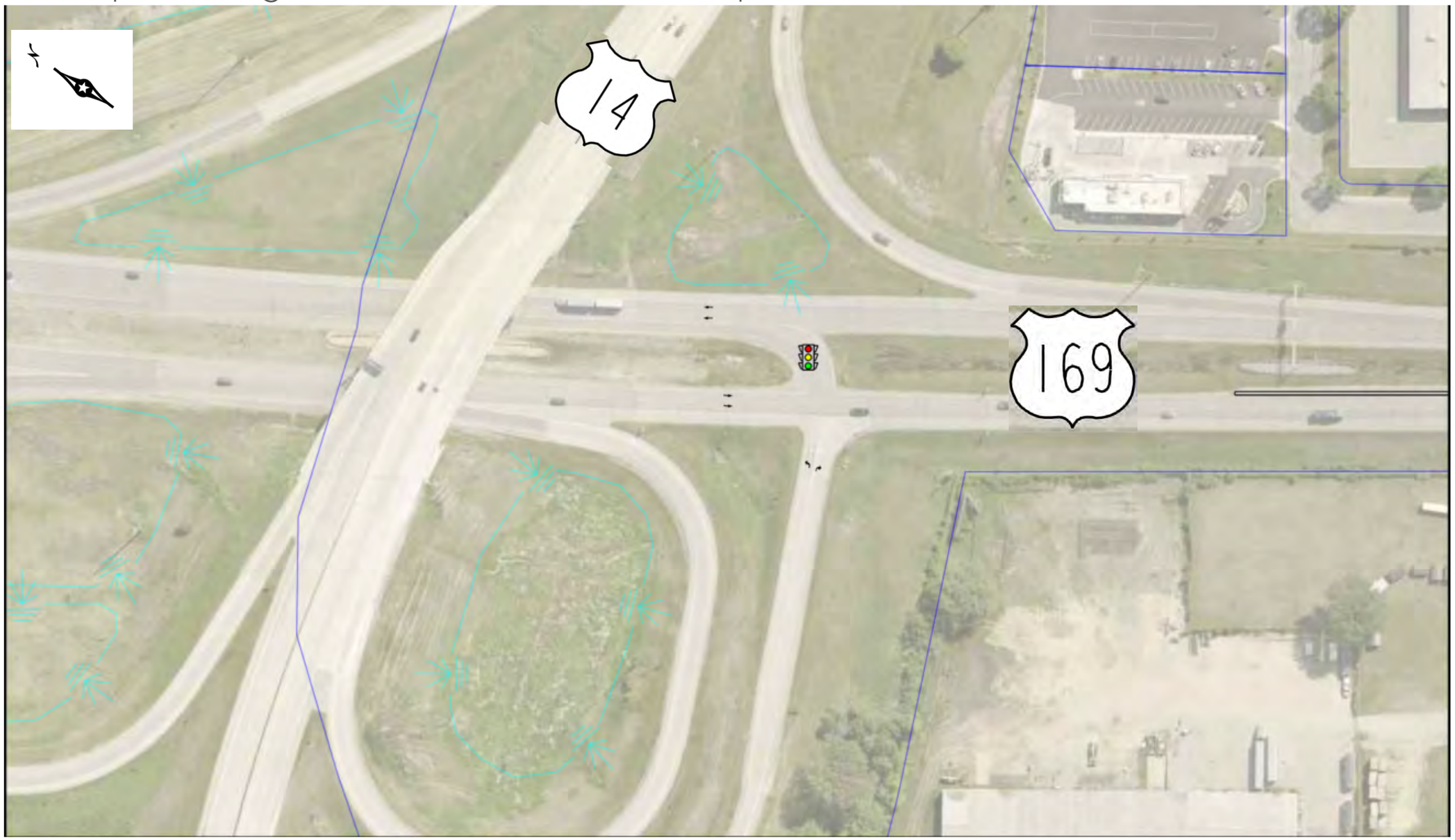
Northern Subarea – Hwy 14 Interchange

Concept 2D: Diverging Diamond



Northern Subarea – Hwy 14 Interchange

Concept 2F: Signalize EB TH 14 Exit Ramp at TH 169



CMF / CRF Details

CMF ID: 9157

Convert intersection to roundabout

Description:

Prior Condition: ***No Prior Condition(s)***

Category: Intersection geometry

Study: ***Road safety effects of roundabouts: A meta-analysis*****, Elvik, R., 2017**

Star Quality Rating:	★★★★★ [View score details]

Crash Modification Factor (CMF)	
Value:	0.56
Adjusted Standard Error:	
Unadjusted Standard Error:	0.043

Crash Reduction Factor (CRF)	
Value:	44 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	4.34

Applicability

Crash Type:	All
Crash Severity:	A (serious injury),B (minor injury),C (possible injury)
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Not specified
Traffic Volume:	
Time of Day:	Not specified

If countermeasure is intersection-based

Intersection Type:	Not specified
Intersection Geometry:	Not specified
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	1975 to 2014
Municipality:	
State:	No state(s) chosen.
Country:	Multiple countries

Type of Methodology Used:	10
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Jan-17-2018
Comments:	Includes single and double lane roundabouts

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 10084

Conversion of intersection to roundabout

Description: Conversion of stop- and signal-controlled intersections into roundabouts

Prior Condition: Intersections without roundabouts

Category: Intersection geometry

Study: *Safety Evaluation of Roundabouts in Georgia*, Gbologah et al., 2019

Star Quality Rating:	★★★☆☆ [View score details]

Crash Modification Factor (CMF)	
Value:	0.642
Adjusted Standard Error:	
Unadjusted Standard Error:	

Crash Reduction Factor (CRF)	
Value:	35.8 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	

Unadjusted Standard Error:	

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	Undivided
Speed Limit:	
Area Type:	All
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	4-leg
Traffic Control:	Not specified
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	2007 to 2014
Municipality:	
State:	GA

Country:	United States
Type of Methodology Used:	2
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Jul-26-2019
Comments:	Applies to the conversion of a four-leg intersection to a single-lane roundabout. CMF analysis omits roundabout locations with less than four average observed crashes per year in before period as one sample, roundabout locations with just a single data-year of crashes in before or after period, and roundabout locations with zero observed crashes in the before period.

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	Intersections of TH 169/Lind St/River Ln and TH 169/Webster Ave				

B. Project Description

Proposed Work	Install Roundabouts		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

	Fatal (K) Crashes	**Reference**	A Study of the Traffic Safety at Roundabouts in Minnesota (2017)
	Serious Injury (A) Crashes		
0.64	**Moderate Injury (B) Crashes**	**Crash Type**	All
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**All**	**< optional 2nd CMF >**
K crashes		
A crashes		
B crashes	8	
C crashes		
PDO crashes		

F. Benefit-Cost Calculation

$2,465,255	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 1 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	2.88	0.58	$120,960
C crashes	0.00	0.00	$0
PDO crashes	0.00	0.00	$0
			$120,960

H. Amortized Benefit

Total = $2,465,255

Year	Crash Benefits	Present Value
2025	$120,960	$120,960
2026	$122,412	$121,200
2027	$123,880	$121,440
2028	$125,367	$121,680
2029	$126,871	$121,921
2030	$128,394	$122,162
2031	$129,935	$122,404
2032	$131,494	$122,647
2033	$133,072	$122,890
2034	$134,669	$123,133
2035	$136,285	$123,377
2036	$137,920	$123,621
2037	$139,575	$123,866
2038	$141,250	$124,111
2039	$142,945	$124,357
2040	$144,660	$124,603
2041	$146,396	$124,850
2042	$148,153	$125,097
2043	$149,931	$125,345
2044	$151,730	$125,593
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	Intersections of TH 169/Lind St/River Ln and TH 169/Webster Ave				

B. Project Description

Proposed Work	Install Roundabouts		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

	Fatal (K) Crashes	**Reference**	A Study of the Traffic Safety at Roundabouts in Minnesota (2017)
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	All
0.90	**Possible Injury (C) Crashes**		
	Property Damage Only Crashes		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**All**	**< optional 2nd CMF >**
K crashes		
A crashes		
B crashes		
C crashes	15	
PDO crashes		

F. Benefit-Cost Calculation

$672,565	**Benefit (present value)**
$0	**Cost**

B/C Ratio = N/A

Proposed project expected to reduce 1 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	1.50	0.30	$33,000
PDO crashes	0.00	0.00	$0
			$33,000

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$33,000	$33,000
2026	$33,396	$33,065
2027	$33,797	$33,131
2028	$34,202	$33,196
2029	$34,613	$33,262
2030	$35,028	$33,328
2031	$35,448	$33,394
2032	$35,874	$33,460
2033	$36,304	$33,526
2034	$36,740	$33,593
2035	$37,181	$33,659
2036	$37,627	$33,726
2037	$38,079	$33,793
2038	$38,535	$33,860
2039	$38,998	$33,927
2040	$39,466	$33,994
2041	$39,939	$34,061
2042	$40,419	$34,129
2043	$40,904	$34,196
2044	$41,395	$34,264
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $672,565

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	Intersections of TH 169/Lind St/River Ln and TH 169/Webster Ave				

B. Project Description

Proposed Work	Install Roundabouts		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

	Fatal (K) Crashes	**Reference**	A Study of the Traffic Safety at Roundabouts in Minnesota (2017)
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	All
	Possible Injury (C) Crashes		
1.75	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**All**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	0	
C crashes	0	
PDO crashes	75	

F. Benefit-Cost Calculation

-$2,751,401	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce -12 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	0.00	0.00	$0
PDO crashes	-56.25	-11.25	-$135,000
			-$135,000

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	-$135,000	-$135,000
2026	-$136,620	-$135,267
2027	-$138,259	-$135,535
2028	-$139,919	-$135,804
2029	-$141,598	-$136,072
2030	-$143,297	-$136,342
2031	-$145,016	-$136,612
2032	-$146,757	-$136,882
2033	-$148,518	-$137,153
2034	-$150,300	-$137,425
2035	-$152,103	-$137,697
2036	-$153,929	-$137,970
2037	-$155,776	-$138,243
2038	-$157,645	-$138,517
2039	-$159,537	-$138,791
2040	-$161,451	-$139,066
2041	-$163,389	-$139,341
2042	-$165,349	-$139,617
2043	-$167,334	-$139,894
2044	-$169,342	-$140,171
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = -$2,751,401

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	Intersections of TH 169/Lind St/River Ln and TH 169/Webster Ave				

B. Project Description

Proposed Work	Install Restricted Crossing U-Turn		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.23	**Fatal (K) Crashes**	**Reference**	2017 MnDOT Study of the Traffic Safety at Reduced Conflict Intersections
0.23	**Serious Injury (A) Crashes**		
0.23	**Moderate Injury (B) Crashes**	**Crash Type**	Angle
0.23	**Possible Injury (C) Crashes**		
0.23	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	Angle	< optional 2nd CMF >
K crashes	0	
A crashes	0	
B crashes	1	
C crashes	2	
PDO crashes	10	

F. Benefit-Cost Calculation

$1,694,000	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 3 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.2%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.77	0.15	$32,340
C crashes	1.54	0.31	$33,880
PDO crashes	7.70	1.54	$18,480
			$84,700

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$84,700	$84,700
2026	$85,716	$84,700
2027	$86,745	$84,700
2028	$87,786	$84,700
2029	$88,839	$84,700
2030	$89,905	$84,700
2031	$90,984	$84,700
2032	$92,076	$84,700
2033	$93,181	$84,700
2034	$94,299	$84,700
2035	$95,431	$84,700
2036	$96,576	$84,700
2037	$97,735	$84,700
2038	$98,908	$84,700
2039	$100,095	$84,700
2040	$101,296	$84,700
2041	$102,511	$84,700
2042	$103,741	$84,700
2043	$104,986	$84,700
2044	$106,246	$84,700
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $1,694,000

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	Intersections of TH 169/Lind St/River Ln and TH 169/Webster Ave				

B. Project Description

Proposed Work	Install Restricted Crossing U-Turn		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.65	**Fatal (K) Crashes**	**Reference**	MnDOT Tech Memo: Restricted Crossing U-Turn - Design and Implementation Guidance
0.65	**Serious Injury (A) Crashes**		
0.65	**Moderate Injury (B) Crashes**	**Crash Type**	All
0.65	**Possible Injury (C) Crashes**		
0.65	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**All**	**< optional 2nd CMF >**
K crashes	0	
A crashes	1	
B crashes	7	
C crashes	13	
PDO crashes	65	

F. Benefit-Cost Calculation

$6,104,000	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 7 crashes annually, 1 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.2%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.35	0.07	$47,600
B crashes	2.45	0.49	$102,900
C crashes	4.55	0.91	$100,100
PDO crashes	22.75	4.55	$54,600
			$305,200

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$305,200	$305,200
2026	$308,862	$305,200
2027	$312,569	$305,200
2028	$316,320	$305,200
2029	$320,115	$305,200
2030	$323,957	$305,200
2031	$327,844	$305,200
2032	$331,778	$305,200
2033	$335,760	$305,200
2034	$339,789	$305,200
2035	$343,866	$305,200
2036	$347,993	$305,200
2037	$352,169	$305,200
2038	$356,395	$305,200
2039	$360,671	$305,200
2040	$364,999	$305,200
2041	$369,379	$305,200
2042	$373,812	$305,200
2043	$378,298	$305,200
2044	$382,837	$305,200
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $6,104,000

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	Intersections of TH 169/Lind St/River Ln and TH 169/Webster Ave				

B. Project Description

Proposed Work	Install Grade Separated Interchage with Roundabouts		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.24	**Fatal (K) Crashes**	**Reference**	Highway Safety Manual and CMF ID 9157
0.24	**Serious Injury (A) Crashes**		
0.24	**Moderate Injury (B) Crashes**	**Crash Type**	All Injury Crashes
0.24	**Possible Injury (C) Crashes**		
	Property Damage Only Crashes		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	All Injury Crashes	< optional 2nd CMF >
K crashes	0	
A crashes	1	
B crashes	8	
C crashes	15	
PDO crashes	0	

F. Benefit-Cost Calculation

$12,409,396	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 4 crashes annually, 1 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.76	0.15	$103,251
B crashes	6.07	1.21	$255,091
C crashes	11.39	2.28	$250,536
PDO crashes	0.00	0.00	$0
			$608,878

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$608,878	$608,878
2026	$616,185	$610,084
2027	$623,579	$611,292
2028	$631,062	$612,503
2029	$638,635	$613,716
2030	$646,298	$614,931
2031	$654,054	$616,149
2032	$661,903	$617,369
2033	$669,846	$618,591
2034	$677,884	$619,816
2035	$686,018	$621,043
2036	$694,251	$622,273
2037	$702,582	$623,505
2038	$711,012	$624,740
2039	$719,545	$625,977
2040	$728,179	$627,217
2041	$736,917	$628,459
2042	$745,760	$629,703
2043	$754,709	$630,950
2044	$763,766	$632,200
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $12,409,396

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	Intersections of TH 169/Lind St/River Ln and TH 169/Webster Ave				

B. Project Description

Proposed Work	Install Grade Separated Interchage with Roundabouts		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

	Fatal (K) Crashes	**Reference**	Highway Safety Manual and CMF ID 10084
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	All
	Possible Injury (C) Crashes		
0.37	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**All**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	0	
C crashes	0	
PDO crashes	75	

F. Benefit-Cost Calculation

$2,302,519	**Benefit (present value)**
$0	**Cost**

B/C Ratio = N/A

Proposed project expected to reduce 10 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	0.00	0.00	$0
PDO crashes	47.07	9.41	$112,975
			$112,975

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$112,975	$112,975
2026	$114,331	$113,199
2027	$115,703	$113,423
2028	$117,091	$113,648
2029	$118,496	$113,873
2030	$119,918	$114,098
2031	$121,357	$114,324
2032	$122,814	$114,551
2033	$124,287	$114,777
2034	$125,779	$115,005
2035	$127,288	$115,232
2036	$128,816	$115,461
2037	$130,361	$115,689
2038	$131,926	$115,918
2039	$133,509	$116,148
2040	$135,111	$116,378
2041	$136,732	$116,608
2042	$138,373	$116,839
2043	$140,034	$117,071
2044	$141,714	$117,302
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $2,302,519

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Convert to Full Cloverleaf Interchange		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.50	**Fatal (K) Crashes**	**Reference**	Based on change in crossing conflict points
0.50	**Serious Injury (A) Crashes**		
0.50	**Moderate Injury (B) Crashes**	**Crash Type**	Angle
0.50	**Possible Injury (C) Crashes**		
0.50	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	Angle	< optional 2nd CMF >
K crashes	0	
A crashes	0	
B crashes	3	
C crashes	5	
PDO crashes	3	

F. Benefit-Cost Calculation

$2,468,951	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 2 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	1.50	0.30	$63,000
C crashes	2.50	0.50	$55,000
PDO crashes	1.50	0.30	$3,600
			$121,600

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$121,600	$121,600
2026	$123,011	$121,793
2027	$124,437	$121,986
2028	$125,881	$122,179
2029	$127,341	$122,372
2030	$128,818	$122,566
2031	$130,313	$122,760
2032	$131,824	$122,955
2033	$133,353	$123,150
2034	$134,900	$123,345
2035	$136,465	$123,540
2036	$138,048	$123,736
2037	$139,650	$123,932
2038	$141,269	$124,128
2039	$142,908	$124,325
2040	$144,566	$124,522
2041	$146,243	$124,719
2042	$147,939	$124,917
2043	$149,655	$125,114
2044	$151,391	$125,313
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $2,468,951

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Install Traffic Signal at EB TH 14 Ramp and TH 169, Eliminate SB to EB Loop Ramp		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

2.50	**Fatal (K) Crashes**	**Reference**	Based on change in crossing conflict points
2.50	**Serious Injury (A) Crashes**		
2.50	**Moderate Injury (B) Crashes**	**Crash Type**	Angle
2.50	**Possible Injury (C) Crashes**		
2.50	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	Angle	< optional 2nd CMF >
K crashes	0	
A crashes	0	
B crashes	3	
C crashes	5	
PDO crashes	3	

F. Benefit-Cost Calculation

-$7,406,852	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce -4 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	-4.50	-0.90	-$189,000
C crashes	-7.50	-1.50	-$165,000
PDO crashes	-4.50	-0.90	-$10,800
			-$364,800

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	-$364,800	-$364,800
2026	-$369,032	-$365,378
2027	-$373,312	-$365,957
2028	-$377,643	-$366,536
2029	-$382,024	-$367,117
2030	-$386,455	-$367,699
2031	-$390,938	-$368,281
2032	-$395,473	-$368,865
2033	-$400,060	-$369,449
2034	-$404,701	-$370,034
2035	-$409,395	-$370,620
2036	-$414,144	-$371,208
2037	-$418,949	-$371,796
2038	-$423,808	-$372,385
2039	-$428,725	-$372,974
2040	-$433,698	-$373,565
2041	-$438,729	-$374,157
2042	-$443,818	-$374,750
2043	-$448,966	-$375,343
2044	-$454,174	-$375,938
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = -$7,406,852

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Install Traffic Signal at EB TH 14 Ramp and TH 169, Eliminate SB to EB Loop Ramp		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

2.13	**Fatal (K) Crashes**	**Reference**	Based on change in merging conflict points
2.13	**Serious Injury (A) Crashes**		
2.13	**Moderate Injury (B) Crashes**	**Crash Type**	Sideswipe
2.13	**Possible Injury (C) Crashes**		
2.13	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**Sideswipe**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	0	
C crashes	0	
PDO crashes	2	

F. Benefit-Cost Calculation

-$110,129	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce -1 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	0.00	0.00	$0
PDO crashes	-2.26	-0.45	-$5,424
			-$5,424

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	-$5,424	-$5,424
2026	-$5,487	-$5,433
2027	-$5,551	-$5,441
2028	-$5,615	-$5,450
2029	-$5,680	-$5,458
2030	-$5,746	-$5,467
2031	-$5,813	-$5,476
2032	-$5,880	-$5,484
2033	-$5,948	-$5,493
2034	-$6,017	-$5,502
2035	-$6,087	-$5,511
2036	-$6,158	-$5,519
2037	-$6,229	-$5,528
2038	-$6,301	-$5,537
2039	-$6,374	-$5,546
2040	-$6,448	-$5,554
2041	-$6,523	-$5,563
2042	-$6,599	-$5,572
2043	-$6,675	-$5,581
2044	-$6,753	-$5,590
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = -$110,129

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Convert to Diverging Diamond Interchange		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

3.25	**Fatal (K) Crashes**	**Reference**	Based on change in crossing conflict points
3.25	**Serious Injury (A) Crashes**		
3.25	**Moderate Injury (B) Crashes**	**Crash Type**	Angle
3.25	**Possible Injury (C) Crashes**		
3.25	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	Angle	< optional 2nd CMF >
K crashes	0	
A crashes	0	
B crashes	3	
C crashes	5	
PDO crashes	3	

F. Benefit-Cost Calculation

-$11,110,278	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce -5 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	-6.75	-1.35	-$283,500
C crashes	-11.25	-2.25	-$247,500
PDO crashes	-6.75	-1.35	-$16,200
			-$547,200

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	-$547,200	-$547,200
2026	-$553,548	-$548,067
2027	-$559,969	-$548,935
2028	-$566,464	-$549,805
2029	-$573,035	-$550,676
2030	-$579,683	-$551,548
2031	-$586,407	-$552,422
2032	-$593,209	-$553,297
2033	-$600,090	-$554,173
2034	-$607,051	-$555,051
2035	-$614,093	-$555,931
2036	-$621,217	-$556,811
2037	-$628,423	-$557,693
2038	-$635,713	-$558,577
2039	-$643,087	-$559,462
2040	-$650,547	-$560,348
2041	-$658,093	-$561,236
2042	-$665,727	-$562,125
2043	-$673,449	-$563,015
2044	-$681,261	-$563,907
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = -$11,110,278

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Convert to Diverging Diamond Interchange		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

2.13	**Fatal (K) Crashes**	**Reference**	Based on change in merging conflict points
2.13	**Serious Injury (A) Crashes**		
2.13	**Moderate Injury (B) Crashes**	**Crash Type**	Sideswipe
2.13	**Possible Injury (C) Crashes**		
2.13	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**Sideswipe**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	0	
C crashes	0	
PDO crashes	2	

F. Benefit-Cost Calculation

-$110,129	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce -1 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	0.00	0.00	$0
C crashes	0.00	0.00	$0
PDO crashes	-2.26	-0.45	-$5,424
			-$5,424

H. Amortized Benefit

Total = -$110,129

Year	Crash Benefits	Present Value
2025	-$5,424	-$5,424
2026	-$5,487	-$5,433
2027	-$5,551	-$5,441
2028	-$5,615	-$5,450
2029	-$5,680	-$5,458
2030	-$5,746	-$5,467
2031	-$5,813	-$5,476
2032	-$5,880	-$5,484
2033	-$5,948	-$5,493
2034	-$6,017	-$5,502
2035	-$6,087	-$5,511
2036	-$6,158	-$5,519
2037	-$6,229	-$5,528
2038	-$6,301	-$5,537
2039	-$6,374	-$5,546
2040	-$6,448	-$5,554
2041	-$6,523	-$5,563
2042	-$6,599	-$5,572
2043	-$6,675	-$5,581
2044	-$6,753	-$5,590
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 at Lind St				

B. Project Description

Proposed Work	N/A - Rear End Crashes at Lind for Comparison		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.00	**Fatal (K) Crashes**	**Reference**	Based on change in mainline delay (comparing Lind to TH 14)
0.00	**Serious Injury (A) Crashes**		
0.00	**Moderate Injury (B) Crashes**	**Crash Type**	Rear End
0.00	**Possible Injury (C) Crashes**		
0.00	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT (Rear End Crashes at Lind)			

Crash Severity	**Rear End**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	4	
C crashes	11	
PDO crashes	48	

F. Benefit-Cost Calculation

$10,663,593	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 13 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	4.00	0.80	$168,000
C crashes	11.00	2.20	$242,000
PDO crashes	48.00	9.60	$115,200
			$525,200

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$525,200	$525,200
2026	$531,292	$526,032
2027	$537,455	$526,865
2028	$543,690	$527,700
2029	$549,997	$528,536
2030	$556,377	$529,373
2031	$562,831	$530,212
2032	$569,359	$531,052
2033	$575,964	$531,893
2034	$582,645	$532,736
2035	$589,404	$533,580
2036	$596,241	$534,425
2037	$603,157	$535,271
2038	$610,154	$536,119
2039	$617,232	$536,969
2040	$624,392	$537,819
2041	$631,635	$538,671
2042	$638,961	$539,525
2043	$646,373	$540,379
2044	$653,871	$541,235
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $10,663,593

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Install Traffic Signal at EB TH 14 Ramp and TH 169, Eliminate SB to EB Loop Ramp		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.40	**Fatal (K) Crashes**	**Reference**	Based on change in mainline delay (comparing Lind to TH 14)
0.40	**Serious Injury (A) Crashes**		
0.40	**Moderate Injury (B) Crashes**	**Crash Type**	Rear End
0.40	**Possible Injury (C) Crashes**		
0.40	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**Rear End**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	4	
C crashes	11	
PDO crashes	48	

F. Benefit-Cost Calculation

$6,398,156	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 8 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	2.40	0.48	$100,800
C crashes	6.60	1.32	$145,200
PDO crashes	28.80	5.76	$69,120
			$315,120

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$315,120	$315,120
2026	$318,775	$315,619
2027	$322,473	$316,119
2028	$326,214	$316,620
2029	$329,998	$317,122
2030	$333,826	$317,624
2031	$337,698	$318,127
2032	$341,616	$318,631
2033	$345,578	$319,136
2034	$349,587	$319,641
2035	$353,642	$320,148
2036	$357,745	$320,655
2037	$361,894	$321,163
2038	$366,092	$321,672
2039	$370,339	$322,181
2040	$374,635	$322,692
2041	$378,981	$323,203
2042	$383,377	$323,715
2043	$387,824	$324,228
2044	$392,323	$324,741
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $6,398,156

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Convert to Diverging Diamond Interchange		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.25	**Fatal (K) Crashes**	**Reference**	Based on change in mainline delay (comparing Lind to TH 14)
0.25	**Serious Injury (A) Crashes**		
0.25	**Moderate Injury (B) Crashes**	**Crash Type**	Rear End
0.25	**Possible Injury (C) Crashes**		
0.25	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT (Rear End Crashes at Lind)			

Crash Severity	**Rear End**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	4	
C crashes	11	
PDO crashes	48	

F. Benefit-Cost Calculation

$7,997,695	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 10 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	3.00	0.60	$126,000
C crashes	8.25	1.65	$181,500
PDO crashes	36.00	7.20	$86,400
			$393,900

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$393,900	$393,900
2026	$398,469	$394,524
2027	$403,091	$395,149
2028	$407,767	$395,775
2029	$412,497	$396,402
2030	$417,282	$397,030
2031	$422,123	$397,659
2032	$427,020	$398,289
2033	$431,973	$398,920
2034	$436,984	$399,552
2035	$442,053	$400,185
2036	$447,181	$400,819
2037	$452,368	$401,454
2038	$457,615	$402,090
2039	$462,924	$402,727
2040	$468,294	$403,365
2041	$473,726	$404,004
2042	$479,221	$404,644
2043	$484,780	$405,285
2044	$490,404	$405,927
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $7,997,695

Traffic Safety Benefit-Cost Calculation

Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

A. Roadway Description

Route	TH 169	**District**	7	**County**	Nicollet
Begin RP		**End RP**		**Miles**	
Location	TH 169 - TH 14 Interchange				

B. Project Description

Proposed Work	Install Traffic Signal at EB TH 14 Ramp and TH 169		
Project Cost*		**Installation Year**	2025
Project Service Life	20 years	**Traffic Growth Factor**	1.2%

** exclude Right of Way from Project Cost*

C. Crash Modification Factor

0.12	**Fatal (K) Crashes**	**Reference**	Based on change in mainline delay (comparing Lind to TH 14)
0.12	**Serious Injury (A) Crashes**		
0.12	**Moderate Injury (B) Crashes**	**Crash Type**	Rear End
0.12	**Possible Injury (C) Crashes**		
0.12	**Property Damage Only Crashes**		www.CMFclearinghouse.org

D. Crash Modification Factor (optional second CMF)

	Fatal (K) Crashes	**Reference**	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	**Crash Type**	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		www.CMFclearinghouse.org

E. Crash Data

Begin Date	1/1/2015	**End Date**	12/31/2019	5 years
Data Source	MnDOT			

Crash Severity	**Rear End**	**< optional 2nd CMF >**
K crashes	0	
A crashes	0	
B crashes	4	
C crashes	11	
PDO crashes	48	

F. Benefit-Cost Calculation

$9,383,962	**Benefit (present value)**	**B/C Ratio = N/A**
$0	**Cost**	

Proposed project expected to reduce 12 crashes annually, 0 of which involving fatality or serious injury.

F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	$1,360,000
A crashes	$680,000
B crashes	$210,000
C crashes	$110,000
PDO crashes	$12,000

Link: mndot.gov/planning/program/appendix_a.html

Real Discount Rate	1.0%
Traffic Growth Rate	1.2%
Project Service Life	20 years

G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	$0
A crashes	0.00	0.00	$0
B crashes	3.52	0.70	$147,840
C crashes	9.68	1.94	$212,960
PDO crashes	42.24	8.45	$101,376
			$462,176

H. Amortized Benefit

Year	Crash Benefits	Present Value
2025	$462,176	$462,176
2026	$467,537	$462,908
2027	$472,961	$463,641
2028	$478,447	$464,376
2029	$483,997	$465,112
2030	$489,611	$465,848
2031	$495,291	$466,586
2032	$501,036	$467,326
2033	$506,848	$468,066
2034	$512,728	$468,807
2035	$518,675	$469,550
2036	$524,692	$470,294
2037	$530,778	$471,039
2038	$536,935	$471,785
2039	$543,164	$472,532
2040	$549,465	$473,281
2041	$555,838	$474,031
2042	$562,286	$474,782
2043	$568,809	$475,534
2044	$575,407	$476,287
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0
0	$0	$0

Total = $9,383,962

Evaluation Memo Appendix G

IMPLEMENTATION PLAN

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

MAPO Highway 169 Corridor Study

Northern Subarea Implementation Plan

Priority*	Timeframe	Section	Project Name or #	Project Description	Estimated 2022 Cost** and (Anticipated Build Year Cost)	Benefit Cost Ratio	Lead Agency	Cost Participation	Likely Funding Sources	Potential Competitive Funding Sources	Comments
Short-Term 0 to 5 Years	2021 - 2025	Highway 14 interchange	Eastbound Ramp Signal	A standalone traditional signal system at the eastbound Highway 14 exit ramp intersection with Highway 169.	$500,000	161.74	MnDOT	NA	TH, LOCAL	LPP, HSIP	Can be constructed as an independent standalone project to improve operations at the eastbound Highway 14 exit ramp intersection.
				Subtotal	***$500,000***						
Mid-term 6 to 15 Years	2026 - 2030	North River Lane to Webster Avenue	North River Lane and Webster Avenue Roundabouts or Signals	Closure of the Lind Street intersection with a new full access intersection (roundabout or signal) at North River Lane and reconstruction of the Webster Avenue intersection to either a roundabout or leave as signal control. Lind Street closure shall not occur before the new full access intersection at North River Lane is established. Closure of Lind Street and the new full access intersection at North River Lane will require a new local connection on the east side of Hiniker Pond from Lind Street to Butterworth Street and connecting to the North River Lane intersection with Highway 169.	$3.7-7.3M ($4.7-9.3M in 2027 $)	Roundabouts: 2.69 Signals: -2.64	MnDOT	City of Mankato, City of North Mankato	TH, LOCAL	HSIP, LPP, LRIP,COC, MNHFP TED/TEDI, State Bonding Bill	The concept allows for further evaluation of a signal or roundabout control at each intersection. The public and PMT had preference for roundabout controls at each intersection. Either intersection control can be paired with the Eastbound Ramp Signal project or a future Highway 14/169 Diverging Diamond interchange. Should be planned to be paired with MnDOT planned investments for 2027.
		Webster Avenue intersection	Webster Avenue Intersection Modernization	Range Street remains open with modifications to lane striping/utilization on Webster Avenue and Range Street at the intersection. Closee Speedway driveway access to Webster Avenue.	$450,000 ($575,000 in 2027 $)	-	City of North Mankato	NA	LOCAL	LPP, HSIP	To be paired with the North River Lane and Webster Avenue Roundabouts or Signal project. While improvements to operations may occur this concept does not address safety issues to a degree that would make it competitive for funding.
		Highway 14 interchange to Lind Street	Grade Separated Pedestrian Crossings of Highway 169	Public support and evaluation scoring was strongest for the grade separated pedestrian crossing just north of the current Lind Street intersection because the surrounding amenities create pedestrian demand to cross near that location. However agency feedback recognized the benefit of utilizing the existing Highway 14 bridge if possible.	$4M ($5.9M in 2030 $)	-	MnDOT	Cost participation from local agencies based on the MnDOT Cost Participation Policy	TH, LOCAL	LPP, TAP	If paired with a larger roadway reconstruction project the cost of a pedestrian grade separation could be included in a RAISE or INFRA request. More competitive funding options are available if paired with larger roadway project.
				Subtotal	*$8.2-15.7M*						
Opportunity / Development / Safety Driven	Illustrative	Highway 14 interchange	Diverging Diamond Interchange	Reconstruction of the existing Highway 14/169 partial cloverleaf interchange into a diverging diamond interchange with signalized ramp intersections.	$9M	5.08	MnDOT	City of Mankato, City of North Mankato	TH, LOCAL	RAISE, INFRA, COC, MNHFP TED, State Bonding Bill	Only needed with increased development and crash issues associated with the weaving created by the existing cloverleaf ramps. Could be paired with roundabouts or signals at North River Lane and Webster Ave.
		Webster Avenue	Grade Separated Pedestrian Crossings of Highway 169	Agency feedback recognized that a grade separated crossing could also be beneficial at Webster Avenue but would only be needed if pedestrian movements were not adequately accommodated on the Veteran's Memorial Bridge and a future Lind Street area pedestrian grade separation.	$5M	-	City of North Mankato	City of Mankato, MnDOT	TH, LOCAL	LPP, TAP	Should consider pedestrian improvements considered in 2025 Veterans Memorial Bridge project. If paired with a larger roadway reconstruction project the cost of a pedestrian grade separation could be included in a RAISE or INFRA request. More competitive funding options are available if paired with larger roadway project.

*Timing of all projects dependent upon funding availability.

** All estimated costs are for individual improvements only and don't capture the full right-of-way and easement costs. Mid-term costs are inflated to an approximate build year as noted. Opportunity driven costs were not inflated since build year is unknown.

FUNDING KEY

COC Corridors of Commerce Funds (State)

CO County State Aid Highway, County Sales Tax, Wheelage, or Other County Funds

HSIP Highway Safety Improvement Program Funds (Federal)

LOCAL City Funding MSAS or Township

LPP Local Partnership Program Funds (State)

LRIP Local Road Improvement Program Funds (State)

MHFP Minnesota Highway Freight Program Funds (State)

PRIV Private Funding / Development (Private)

SRTS Safe Routes to School

TAP Transportation Alternatives Program (Federal)

STP Surface Transportation Program Funds (Federal)

TE Transportation Enhancement Funds (Federal)

TED/I Transportation Economic Development (State)

TH Trunk Highway Funds (State)

RAISE Rebuilding American Infrastructure with Sustainability and Equity (Federal)

INFRA Infrastructure for Rebuilding America (Federal)

TRLF Transportation Revolving Loan Fund (Federal)

TBACK Turnback Funds (State)

MAPO Highway 169 Corridor Study

Southern Subarea Implementation Plan

Priority*	Timeframe	Section	Project Name or #	Project Description	Estimated 2022 Cost** and (Anticipated Build Year Cost)	Lead Agency***	Cost Participation	Likely Funding Sources	Potential Competitive Funding Sources	Comments
Short-Term 0 to 5 Years	2021 - 2025	1 - Blue Earth River to County Highway 33	1D	Reduced conflict intersection at Amos Owen Lane with southbound to eastbound left removed and replaced with U-turn to the west of the intersection. Hawley Street is right-in/right-out. OR Full R-cut intersection at Amos Owen Lane with Hawley Street remaining open as it is today. Green T with traffic signal, at CR 33, for eastbound and all left turning traffic (northbound to westbound left and westbound to southbound left).	$2.2M	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CSAH, CO	LPP, HSIP, MNHFP, TED	The Amos Owen Lane and County Highway 33 improvements need to be paired together for full safety benefits. The Green T at County Highway 33 is necessary, prior to closure of Hawley Street, to provide for the displaced left turns onto and off of Hwy 169. During the study, MnDOT expressed concern with the addition of a traffic signal at this location due to its rural, high-speed character. MnDOT will revisit this recommendation when a project becomes more imminent to determine if an at-grade Green-T intersection is recommended versus looking towards partial grade separation that would maintain free-flow conditions on Highway 169.
		Hawley Street Pedestrian Bridge	Hawley Street Pedestrian Bridge	Pedestrian overpass across Highway 169/Hawley Street intersection with touchdowns at northwest to southeast quadrants, utilizing State of MN property (NW quadrant) and an undeveloped property (SW quadrant).	$5M	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	DNR, TAP, LPP	High level project cost in 2023 dollars including engineering and contingency estimates. Does not include right-of-way costs for the parcel on the SE quadrant.
		2 - County Highway 33 to County Highway 90	2A	CR 120 acceleration lanes.	$660,000	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	LPP, HSIP	Can be constructed independently as an interim improvement prior to a Highway 68 High-T
				Subtotal	*$7.9M*					
Mid-term 6 to 15 Years	2026 - 2030	2 - County Road 33 to County Highway 90	2A	High T at Highway 68.	$22.2M ($32.8M in 2030 $)	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	HSIP, COC, TED,/TEDI State Bonding Bill	High T to be paired with larger Highway 68 reconstruction project, serving as a capacity building project to be completed prior to the project, and provide a detour for future Highway 14 construction. Alternatively, the project could be modified slightly and paired with 1C instead of 1D and allow for a full median at County Highway 33. Construction will not impact the existing Minneopa Trail Pedestrian Bridge.
				CR 69 median closure and new local street connection to close multiple driveways on Highway 169. Convert CR 120 to R-cut.						County Highway 69 improvements remove all left turns so they must occur after the Highway 68 High T which can replace those movements within this area.
		3- County Road 90 to 133th Lane	3A	208th Lane and Loren Drive access closures with new local road connections. Reduced conflict intersection at Highway 60 at Highway 169 with northbound to westbound removed and replaced with U-turns	$1.9M ($2.8M in 2030 $)	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	LPP, HSIP	208th Lane and Loren Drive access closures must happen simultaneously or previous to the Highway 60 and Gadwall Road R-cut.
				Subtotal	*$24.1-35.6M*					
Opportunity / Development / Safety Driven	Illustrative	1 - Blue Earth River to County Highway 33	1D	Acceleration lane from Hawley Street to eastbound Highway 169	$2.5M	MnDOT	TBD	TH	TBD	Time with a Blue Earth River Crossing bridge project.
		2 - County Highway 33 to County Highway 90	2C	CR 68 realignment with Highway 169 and extension of Southbend Ave (CR 69). Includes local driveway and median closures between Highway 68 and CR 69.	$9M	TBD	TBD	TH, LOCAL, CO	TBD	Could be warranted if new industrial, commercial, or residential developments occur. Current local plans do not show planned development that would require these improvements.
		3- County Highway 90 to 133th Lane	3B	Full access intersection at Highway 60 and 169 with access closure at 208th Lane and new local road access. Realignment and extension of Gadwall Road to a new full access intersection with Highway 169 east of the current intersection. Includes cul-de-sac of CR 117 and new local road connections for existing industrial properties.	$5M	TBD	TBD	TH, LOCAL, CO	TBD	Could be warranted if new industrial, commercial, or residential developments occur. Current local plans do not show planned development that would require these improvements.

Timing of all projects dependent upon funding availability.

*** All estimated costs are for individual improvements only and don't capture the full right-of-way and easement costs. Mid-term costs are inflated to an approximate build year as noted. Opportunity driven costs were not inflated since build year is unknown.*

**** Southern Subarea not currently in the MnDot Capital Highway Investment Plan (CHIP)*

FUNDING KEY

COC Corridors of Commerce Funds (State)

CO County State Aid Highway, County Sales Tax, Wheelage, or Other County Funds

HSIP Highway Safety Improvement Program Funds (Federal)

LOCAL City Funding MSAS or Township

LPP Local Partnership Program Funds (State)

LRIP Local Road Improvement Program Funds (State)

MHFP Minnesota Highway Freight Program Funds (State)

PRIV Private Funding / Development (Private)

SRTS Safe Routes to School

TAP Transportation Alternatives Program (Federal)

STP Surface Transportation Program Funds (Federal)

TE Transportation Enhancement Funds (Federal)

TED/I Transportation Economic Development (State)

TH Trunk Highway Funds (State)

RAISE Rebuilding American Infrastructure with Sustainability and Equity (Federal)

TRLF Transportation Revolving Loan Fund (Federal)

TBACK Turnback Funds (State)

Attachment E – Public Engagement Summaries

Hwy 169 Corridor Study Phase 1 Engagement Summary

2/22/2021

Overview

The first phase of community engagement for the Hwy 169 Corridor Study provided an overview of the existing conditions analysis and an opportunity for the general public to share feedback on issues and opportunities for improvements on the Hwy 169 corridor in Mankato, North Mankato and South Bend Township. Phase one of engagement occurred between December 2020 and January 2021. Figure 1 includes a summary of the engagement strategies used.

Figure 1: Phase 1 engagement strategies summary

Date	Strategy	Description	Participants
Dec. 9 – Dec. 14, 2020	Focus groups	Three focus groups with businesses adjacent to the corridor	22
Jan. 14, 2021	Online meeting	Public meeting via Zoom videoconference	76
Jan. 14 – Jan. 28, 2021	Online open house website	Website with survey, interactive map, and ideas wall	121
Dec. 2020 – Jan. 2021	Email, phone call, or letter	Comments submitted via website comment form, email, phone call, or U.S. mail	25
Jan. 14 – Jan. 28, 2021	Social media	Comments posted on the MnDOT Facebook ad	75

Focus groups

Three focus groups were held between December 9 and December 14, 2020, to collect feedback from businesses adjacent to the corridor. The focus groups were organized by business location based on the three corridor subareas (i.e., north, middle, and south). Business were invited through direct mail, email, and phone calls. Twenty-two business representatives participated in the focus groups.

Online meeting

An online meeting was held via Zoom videoconferencing on January 14, 2021 at 5:30 p.m. During the online meeting, staff gave a presentation sharing the existing conditions analysis. After the presentation, participants were divided into three breakout rooms based on which subarea they were most interested in and they asked questions and provided feedback on issues and opportunities in their subarea. Seventy-six people attended the online meeting.

The meeting was promoted through a variety of methods including:

- **Project website** was updated with online meeting information and other engagement opportunities
- **Social media posts and ad** published on MAPO's Twitter account and MnDOT's Facebook account
- **Postcard** mailed to 6,200+ properties near the project area
- **Email blast** to project email subscriber list and businesses that RSVPed for the focus groups
- **News release** sent to local media outlets and published by Mankato Free Press, KEYC News, and KTOE Radio
- **Project partners** (i.e., cities and counties) shared information with their networks

Online open house website

The online open house website was active from January 14 to January 28, 2021 to share information on the existing conditions analysis, and collect feedback from the community through a survey, interactive map, and an ideas wall. The website was promoted through the same communications methods listed for the online meeting.

There was a total of 121 unique visitors who provided feedback through the site. There were 71 completed surveys, 107 comments on the interactive map, and 28 comments on the ideas wall.

Email, phone call, or letter

Between December 2020 and January 2021, there were 25 people who provided feedback to project staff through the website comment form, email, phone call, or letter.

Social media

A social media post on the MnDOT Facebook account sharing engagement opportunities was boosted to corridor zip codes: 56001, 56002, and 56003. The Facebook ad had a reach of 64,437 Facebook users and garnered 536,958 impressions and 3,123 link clicks to the project website. Impressions are the number of times the ads appeared across the screens of Facebook users. Seventy-five comments were posted to the boosted social media ad.

Social media ad

Highlights

The key highlights from comments are summarized below:

- **Overall corridor**
    - Improving safety and decreasing congestion were the top priorities for corridor-wide improvements.
    - While cars are the primary mode of travel on Hwy 169, many people expressed support for improving walking and biking connections across Hwy 169 to the nearby regional trail networks.
- **Northern subarea** (Lake St to Belgrade Ave in North Mankato and Mankato)
    - There is heavy congestion at the Lind St and Webster Ave traffic lights during peak periods, and drivers have difficulty turning on and off Hwy 169.
    - Maintaining direct accesses at Lind St and Webster Ave is important to businesses to provide easy access for customers and deliveries.

    - There are pedestrian and bicyclist safety concerns crossing Hwy 169 at Lind St and Webster Ave.
    - The existing highway environment appears dated. There is support for improving aesthetics in the Northern subarea with more greenery.
- **Middle subarea** (Belgrade Ave to Blue Earth River crossing in North Mankato and Mankato)
    - There is heavy congestion at the Hwy 169 and Riverfront Dr ramps during peak periods, and there are safety issues for left turns rom Riverfront Dr to northbound Hwy 169.
    - There are pedestrian and bicyclist safety concerns crossing ramps and bridges at Riverfront Dr and Belgrade Ave.
- **Southern subarea** (Blue Earth River crossing to Hwy 60 in Mankato and South Bend Township)
    - It is challenging to merge on and off Hwy 169, particularly at Hwy 68, Hawley St/County Rd 69, and Hwy 60.
    - There are safety concerns for northbound Hwy 169 traffic speeding.
    - There is support for a safe pedestrian and bicyclist crossing at Hawley St/County Rd 69.
    - There are a lot of heavy commercial vehicles accessing businesses in the Southern subarea, and it is important to businesses that changes to the highway accommodate semi-trucks.
    - There are some issues with stormwater drainage for properties adjacent to Hwy 169.

Comment Summary

The following sections include summaries of the community comments collected during phase one engagement, by subarea and theme. For a full tabulation of all comments, see Figure 5.

Northern subarea

The Northern subarea is the segment between Lake St and Belgrade Ave in North Mankato and Mankato.

Congestion

Many people said there is heavy congestion and back-ups during peak periods between Hwy 14 and Webster Ave. People reported that the traffic lights on Lind St and Webster Ave impede traffic flow, and some people said there are issues with traffic light timing causing stop and go traffic at both Lind St and Webster Ave.

Many people also reported that turning movements and lane changes at the Hwy 14/Hwy 169 interchange are challenging because of heavy congestion caused by the traffic lights and because the interchange is so close to the Lind St traffic light.

Some people also said there are traffic queuing issues from side streets during rush hour traffic, particularly at Webster Ave. People said side streets will have major back-ups as drivers wait for an opening to make a right or left turn onto Hwy 169.

Business access

Many people expressed support to maintain business accesses, particularly at Webster Ave and Lind St. Businesses said that the existing full access at-grade intersections are important to provide easy access for customers and deliveries which support existing business growth and long-term business development in this segment.

Pedestrian and bicyclist safety

Many people said that crossing Hwy 169 at Lind St and Webster Ave feels dangerous. Walkers and bikers said they cross the highway in this segment to access the regional trail system on either side of the Minnesota River. Many people said it is difficult for pedestrians and bikers to completely cross the highway in the traffic signal cycle. People also said congestion, high traffic speeds, and drivers not stopping for red lights make walking and biking feel unsafe.

Intersection safety

Some people shared issues with intersection safety in the Northern subarea. People said left turns and crossing Hwy 169 traffic can feel unsafe. Some said that drivers do not know how to use the acceleration lane from eastbound Hwy 14 to northbound Hwy 169. Drivers will wait in the median until an opening which causes unsafe back-ups in the median. People also reported that traffic taking northbound Hwy 169 to the eastbound Hwy 14 ramp will make dangerous lane changes, cutting other drivers off, to quickly get into the exit lane after the Lind St traffic light.

In addition, some people reported that drivers speed through red lights at the Lind St and Webster Ave traffic lights which makes crossing the highway feel unsafe.

When I lived up north and commuted, this [Hwy 14/Hwy 169] was the scariest intersection. Crossing southbound Hwy 169 to get to northbound [Hwy 169] is a gamble for an accident. Gauging traffic flow is difficult.

Interactive map feedback

Aesthetics

Some people said that the existing environment and aesthetics of the corridor is dated or poorly landscaped and maintained (weeds growing in chain link fences and medians). Some people said the overall corridor should maintain highway environment, but others said the Northern subarea should have a more welcoming, urban character as an entrance to North Mankato and Mankato for the community and for Hwy 14 and Hwy 169 regional traffic. People also said aesthetic improvements would support community development and economic development in the subarea. Most people recommended more landscaping for aesthetic improvements, like trees, bushes, and plants.

Other

Some people said that noise pollution is a problem for the residents in the Northern subarea. Some people said there are visibility issues for drivers turning right onto Hwy 169 from Monroe Ave. There were some comments recommending infrastructure improvements including, a full cloverleaf interchange at Hwy 14, a bridge connecting Hwy 169 and Madison Ave, and no roundabouts because they are confusing to drivers and challenging for semi-trucks.

Middle subarea

The Middle subarea is the segment between Belgrade Ave and the Blue Earth River crossing in North Mankato and Mankato.

Intersection safety

Many people reported issues with intersection safety at the Hwy 169 and Riverfront Dr ramps. People said turning left from eastbound Riverfront Dr onto the northbound Hwy 169 on-ramp feels dangerous because it is an uncontrolled intersection, there are high traffic volumes, and they have to watch for westbound Riverfront Dr traffic taking a free right onto the ramp.

Pedestrian and bicyclist safety

Many people shared concerns for pedestrian and bicyclist safety crossing the Hwy 169 on- and off-ramps at Riverfront Dr. People said the heavy congestion and drivers speeding to get on and off the highway make the environment unsafe and that drivers do not yield for pedestrians at ramps. People also said this area receives particularly high pedestrian and bicyclist traffic because of the schools, YMCA, and regional trail system access.

I am concerned about the area around the Veterans Bridge, Belgrade and entering/leaving 169. I live on Belgrade Ave and I walk or bike to the hiking path or Mankato fairly often. While I am careful and stay back as much as I can, the on and off ramps can be dangerous for pedestrians.

Comment form feedback

Additionally, some people said crossing the ramps and bridge at Belgrade Ave feels unsafe. People said heavy traffic on the Veterans Memorial Bridge and lack of space between sidewalks and travel lanes make the environment unfriendly for walkers and bikers. Some people said the bridge has a lot of pedestrian traffic because people are stopping at the dinosaur statue near the southbound Hwy 169 to Belgrade Ave exit to take photos. There was some support for a bike lane on the Veterans Memorial Bridge to connect to the Mulberry St bike lane in Mankato.

Some people also commented that they like the trail on the North Star Bridge because it provides walking and biking connections over the Minnesota River. Some people said the trail on the bridge is too narrow.

Congestion

Many people said that there is congestion at the Riverfront Dr/Hwy 169 ramps during peak periods, particularly when school is released, and some people said traffic at the Belgrade Ave/Hwy 169 ramps get backed-up during rush hour.

Other

Some people said that the curves on Hwy 169 in the Middle subarea can be dangerous during winter conditions. Cars traveling at high speeds can lose control and veer into other travel lanes. There were also some comments about noise pollution in the Middle subarea and poor Hwy 169 pavement condition.

Southern subarea

The Southern subarea is the segment between Blue Earth River crossing and Hwy 60 in Mankato and South Bend Township.

Intersection safety

Many people reported that the crossing and merging onto Hwy 169 feels unsafe, particularly at Hwy 68, Hawley St/County Rd 69, and Hwy 60. Many people said left turns from southbound Hwy 68 to northbound Hwy 169 can be challenging because of speeding traffic and high traffic volumes.

People also said turning movements at the Hawley St/County Rd 69 intersection are challenging. Many said the acceleration lane from northbound Hawley St to northbound Hwy 169 is too short, and it is difficult to merge into traffic. Some said it is challenging for southbound Hwy 169 traffic to turn left onto southbound Hawley St. High traffic volumes and speeding make it difficult to find an opening to cross and cars back-up in the turn lane.

Some people also said that left turns from northbound Hwy 169 onto westbound Hwy 60 are challenging. Cars will pile up in the median waiting for an opening to merge onto Hwy 60.

Speeding

Many people reported issues with northbound Hwy 169 traffic speeding in the Southern subarea. People said that traffic does not slow to 50 MPH which makes driving, walking or biking along or across Hwy 169 feel unsafe.

There is a lot of speeding that goes on in this [Southern] subarea when coming into Mankato after the speed limit reduces to 50 mph.

Interactive map feedback

Pedestrian and bicyclist safety

Many people said crossing Hwy 169 on foot or bike in the Southern subarea feels unsafe. Pedestrians and bicyclists commonly cross Hwy 169 at Hawley St/County Rd 69 to access the Minneopa Trail. People said cars do not stop for pedestrians or bicyclists, so people need to rush across when there is an opening in traffic.

Some people also said they would like a safe pedestrian and bicyclist crossing near Minneopa Golf Club to connect to the regional trail and Minneopa State Park.

Business access

Businesses in the Southern subarea said that ensuring intersections and at-grade accesses from Hwy 169 are safe and wide enough for heavy commercial vehicle turning movements is important. Some businesses said they receive a lot of heavy commercial vehicles and it can be challenging for these vehicles to merge onto the highway because of high traffic speeds and traffic volumes.

Drainage

Some people said there are stormwater drainage issues adjacent to Hwy 169 in the Southern subarea. People said properties west of Hawley St/County Rd 69 between Chapman St/Le Hillier St and Hwy 169 will get substantial water in their yards from highway runoff and in some cases, water has gotten into the basements of homes.

Other

There were many comments about noise pollution in the Southern subarea, particularly noise from trucks Jake braking. There were some comments recommending infrastructure improvements including, flashing light signal when vehicles are approaching from side streets at at-grade crossings, acceleration lanes to help traffic merge onto Hwy 169, and add pedestrian bridges over the highway.

Figure 2: Phase 1 engagement comments

Some of the following comments are paraphrased because they were provided verbally. The subarea that the comment is addressing is provided in brackets to clarify location.

Source	Comment
Focus group	[Northern subarea] Access off of 169 is key for our business to get Semi Tractors and Trailers off of 169 to our business. And we really want to keep it that way.
Focus group	[Northern subarea] Bamco's concern is the potential closure of the Lind Court interchange
Focus group	[Northern subarea] Subway's concern is much like Bamco's concern in the potential closing of Webster avenue access
Focus group	[Northern subarea] We like the access and visibility that the current layout offers.
Focus group	[Northern subarea] Full access from 169 to Webster is important
Focus group	[Northern subarea] Webster Ave is key gateway into north Mankato and into this business district
Focus group	[Northern subarea] For Norwood Inn open access to 169 from Webster Ave. is critical.
Focus group	[Northern subarea] Access is everything for all and probably the most important
Focus group	[Northern subarea] If you would eliminate the Lind court and/or Webster access you would generate a lot of heavy industrial traffic thru residential areas in lower north Mankato.
Focus group	[Northern subarea] We don't see many accidents. it is a long straight stretch in front of many of us
Focus group	[Northern subarea] Travelers on Hwy 169 do not adhere to the 50 mph speed limit. I see most going 55-57 mph.
Focus group	[Northern subarea] Safety issues I have noticed is that the lights at webster seem to constantly have issues. Does this have anything to due with delays or crashes?
Focus group	[Northern subarea] traffic manages it self pretty well at this corner. crashes tend to happen when the lights run too long - I agree with the speed thru that area too
Focus group	[Northern subarea] I see challenges in the access out of Super America to Webster Ave, there is congestion there through out the day with people darting out and hoping its clear to get on to webster
Focus group	[Northern subarea] People run the stop lights at Webster and Lind quite often from what I have seen
Focus group	[Northern subarea] Webster Ave is the easiest way for trucks to deliver to businesses. North Mankato is redeveloping the area and will have more multi-use buildings. The last thing a developer would want is not allowing semis to come in here.
Focus group	[Northern subarea] The truck wash has semi trucks coming into the area from 7 a.m. to 6 p.m. With truck drivers who don't know the area, they'd get lost coming in and out if access is not at Webster.
Focus group	[Northern subarea] Our property at 1120 Center street has semis coming in for Star Trailer, B& M Trailer repair and our freight terminal.
Focus group	[Northern subarea] I've crossed Webster many times on foot. You can get caught in the median and I'm worried about people getting hit there.
Focus group	[Northern subarea] Traffic in this area is a problem now. With contemplated future development in from Hwy 14 the south, will only increase traffic, further increasing traffic activity. Many challenges ahead in figuring this out.

Focus group	[Northern subarea] Not a fan of any "J-Turns".
Focus group	[Northern subarea] This is McDonald's. Obviously West Lind is direct for our customers. The direct access allows our customers to get to us without driving thru larger areas and avoids congestion with other businesses
Focus group	[Northern subarea] Maintaining Direct Access would be #1 for us at the truck wash. Signage would maybe help
Focus group	[Northern subarea] Making intersections smaller would not be ideal for Large Truck Traffic. You've seen the Round about up by HyVee its way to small for semi traffic.
Focus group	[Northern subarea] Hwy 169 is a gateway to North Mankato but it's one of the least attractive stretches in town. Not going to get retail feel in this area without better access for walking, biking, retail and mixed use, and having an additional access point would be beneficial. Without is, no one wants to do anything in the area and development is going to be what it is.
Focus group	[Northern subarea] visualize 'gateway' into the area - so view it not just from one intersection along this area but the entire area as a big welcome to our 'area' - could mean slowing traffic and make it more inviting to stop and visit.
Focus group	[Northern subarea] There are more parks, a community pool, and a daycare in this area. It's changing how some people think of area. People want it to look better.
Focus group	[Northern subarea] Is MnDOT expecting this corridor to grow? Are huge amounts of traffic expected in this area? Will improving look of area increase traffic?
Focus group	[Northern subarea] Lind Street is very close to Hwy 14 on-ramps. Difficult to get in the correct lane quickly due to short distances. Advanced signage on the highway and from the Kwik Trip/Truck Stop side of Lind Street could help.
Focus group	[Middle subarea] The dinosaur on Belgrade Ave used to be located on the other side of the street. Now people can park nearby to take pictures with it. The space near the Hwy 169 is so narrow.
Focus group	[Middle subarea] Lots of people bike on the sidewalk. The sidewalks need to be wider to accommodate bikes. Bicyclists need more education on what they can or can't do.
Focus group	[Middle subarea] Don't have any issues getting on or off Hwy 169 at Belgrade Ave.
Focus group	[Middle subarea] Glad there is a sidewalk on Veterans Memorial Bridge
Focus group	[Middle subarea} Belgrade Ave is landscaped well. They have some nice trees and bushes.
Focus group	[Middle subarea] The lighting on Hwy 169 ramps are good and the road flows fairly well. Some people drive recklessly. Pavement is fairly smooth until Lookout Dr area.
Focus group	[Middle subarea] Riverfront Drive issues – difficult for EB to NB Riverfront Drive movements due to heavy conflicting WB to NB movements and yield condition.
Focus group	[Southern subarea] Where Hwy 68 comes meets Hwy 169 is dangerous. There is an acceleration lane but people don't know to use it. Had a family member die at the intersection recently.
Focus group	[Southern subarea] The CR 90 intersection is confusing. Drivers don't know if they need to go over Hwy 169 or under. Don't want to close accesses onto Hwy 169, but know that its's unsafe.
Focus group	[Southern subarea] Heavy commercial vehicles are going in and out of businesses all day long. CHS runs trucks in/out 24/7. Approximately 500 trucks a day.

Focus group	[Southern subarea] Lots of closely spaced access points on the highway near here. Would prefer RCUTs or U-turns versus trying to cross unprotected at full access locations. Difficult to find a gap during peak periods
Focus group	[Southern subarea] 208th Lane runs parallel to Hwy 169 but is closely spaced and requires tight turns for semi-trucks. Suggestion to extend 208th Lane and consolidate access to one point on Hwy 169.
Focus group	[Southern subarea] TH 68 crossing is challenging – hard to find gaps and safety concerns
Focus group	[Southern subarea] Le Hillier area – lots of pedestrian activity; hard to merge from CSAH 69 (Hawley Street) to eastbound Hwy 169 and the Riverfront Drive interchange
Online meeting	Does environmental include drainage? There are existing significant drainage issues in Southbend. The highway blocks water in.
Online meeting	Do traffic projections consider changing commute patterns (e.g. telework)
Online meeting	What role does wetland preservation/ creation have in drainage systems for the Hwy169 study area?
Online meeting	Easy access to the Hwy is crucial to all businesses on the corridor.
Online meeting	[Northern subarea] One challenge is to coordinate the flow between lights on 169 without excessive delays for crossing traffic.
Online meeting	[Northern subarea] are those signals smart or just on a timer?
Online meeting	[Northern subarea] One of the reasons I wanted to attend the meeting was to voice concerns with Roundabouts and advocate against them. Especially for the future and walking/biking.
Online meeting	[Northern subarea] When talking about feel, this section of 169 doesn't have a very welcoming feel. I try to avoid that area and take other routes. it isn't an appealing area for pedestrians.
Online meeting	[Northern subarea] I would like to see less congestion and better traffic flow.
Online meeting	[Northern subarea] There are a lot of businesses in lower North that need these access points. I would also be concerned with improving speed and flow south bound being limited by the severe dip and turn under Veterans memorial bridge.
Online meeting	[Northern subarea] It would be nice if 169 stayed high speed like 41 does through Oshkosh Wisconsin (Only avoiding the 4 roundabouts at each exit, self driving cars and my back seriously don't handle them well) :P
Online meeting	[Northern subarea] Slow speed and develop area to be more inviting.
Online meeting	[Northern subarea] Does the plan include frontage roads or any changes there? Making them more accessible so you don't need so many inlets or outlets?
Online meeting	[Northern subarea] I would like to see the speed limit at least what it is now, just move traffic.
Online meeting	[Northern subarea] I do wonder effective are rumble strips at cueing drivers into approaching stops/ deceleration areas. Or, what may be the most beneficial street crossings at which to install pedestrian bridge crossings?
Online meeting	[Northern subarea] Walking and biking is very important for our family. that is our preferred form of transportation.
Online meeting	[Northern subarea] What doesn't work is getting to and from Hiniker Pond to the Dog Park as a pedestrian/ bicyclist.
Online meeting	[Northern subarea] don't like rumble strips and its noisy for residents and businesses

Online meeting	[Northern subarea] Safe walking that takes into consideration people with disabilities who may need more time to get across and it needs to be well maintained in the winter is a high priority.
Online meeting	[Northern subarea] pedestrian Bridge over Lind street or slightly south of that
Online meeting	[Northern subarea] With cities of North Mankato and Mankato both actively soliciting businesses to develop and grow this area slowing traffic and making biking/walking access would only make it more attractive.
Online meeting	[Northern subarea] Adding improvements makes the area more inviting so more people will be likely to walk or bike in the area.
Online meeting	[Northern subarea] Are run-off road crashes a safety concern here?
Online meeting	[Northern subarea] I've been alerted a few times by rumble strips on the edge of the pavement, especially when lighting conditions are poor. They're very good for that.
Online meeting	[Northern subarea] The entrance into Mankato from the south is not very inviting for our community. From Blue Earth river crossing it is an elevated area with a lot of concrete until well into North Mankato area. To beatify the area would make for a more inviting community.
Online meeting	[Northern subarea] signals on 169 slightly improved, but smart signals rather than timed would improve flow dramatically, benefit business, and reduce crashes. They also keep traffic more spread out for miles.
Online meeting	[Northern subarea] Signage along the road indicating businesses immediately accessible at the next intersection would reduce traffic going back and forth looking for a particular place.
Online meeting	[Northern subarea] Is Kwik Trip expanding in that area? If so, would this complicate the traffic movement?
Online meeting	[Northern subarea] I think roundabouts would help move traffic and make the area safer.
Online meeting	[Northern subarea] Highway 169 is used as a thoroughway from Sioux Falls to Minneapolis for cars and trucks
Online meeting	[Northern subarea] it looks like a difficult compromise between maintaining some speed and reasonable access for cross traffic. Lind Street has little room for a roundabout, but its proximity to Hwy. 14 creates a bottleneck. Would it help to move the intersection a few dozen yards south?
Online meeting	[Middle subarea] I appreciate the access to pedestrian/bicycle paths that are separated from Hwy 169 by a physical barrier. Please make sure something similar is included in future plans.
Online meeting	[Southern subarea] For me, improving intersection safety for cars, bikes, and pedestrians while maintaining access to surrounding neighborhoods are the priorities
Online meeting	[Southern subarea] Bicyclist and pedestrian safety, followed by alleviating the drainage problem are the priorities
Online meeting	[Southern subarea] I really think we need to make Mankato look nicer to people coming into Mankato on 169, I have heard from Multiple guest that come down from Minneapolis talk about how shappy or dated Mankato looks to them from the hwy
Online meeting	[Southern subarea] My neighborhood doesn't have a park and I would love to have safe and efficient walking and biking to a park. I'm not concerned with aesthetics except for safety lighting
Online meeting	[Southern subarea] The section of I-35E passing through St. Paul is good inspiration for highway aesthetics--the planters and trees in the median are great.

Online meeting	[Southern subarea] I like the St. Paul example since that stretch of 35E reminds me of the corridor of 169 along the CHS plant. Some architectural detailing or planters along the elevated parts of the highway would be great
Online meeting	[Southern subarea] Up on Fargo, the overpass and sound walls have agriculture and river themes in the concrete
Online meeting	[Southern subarea] People drive 60-65 in our area which is 50. I'm not sure if anyone would follow a reduced speed
Online meeting	[Southern subarea] Reducing speeds needs to be balanced with allowing traffic to move smoothly and efficiently through the corridor
Survey	I don't think it's affordable right now.
Survey	By pass st peter to the west. Bring 169 west of north Mankato. Build a bridge near williams park to connect west of north kato route to 169 south. Duh
Survey	Sound abatement
Survey	Use of service roads on both sides of 169. No traffic lights on 169.
Survey	More interchanges, less driveways and intersections on Hwy 169
Survey	Avoid using roundabouts in any new construction.
Survey	No roundabouts! They are dangerous down here. It will impede traffic and create accidents.
Survey	In reference to traffic flow maybe consider doing a traffic study and raising the speed limit to 55-60mph. The 50mph limit is really just not justifiable in my opinion
Survey	Pedestrian crossings at Lind and Webster need to be elevated a bit so that you don't have to walk through puddles
Survey	Minimize noise pollution.
Survey	Noise
Survey	Add a trucks only lane and enforce speed limit of 50 mph
Ideas wall	Yes, people need to be safe at the crossing of 169 at Hawley, and over the hwy to the store at the gas station and to other potions of the neighborhood. People of all ages cross that section of Hwy, and as it is today, hwy 169 is a barrier for families and businesses of South Bend.
Ideas wall	by the West entrance road interchange to Minneopa. the Reichel insulation area. Maybe make more of a gateway to Minneopa entrance signage or ease of turning to that area - vs having to go down the hill to mankato and going left.
Ideas wall	Pedestrian bridges spanning across 169 would be beneficial for those living in Lower North that want to cross to get to businesses and trails along the river.
Ideas wall	"Information on the history and future of noise monitoring. What is being done, short and long term to mitigate noise pollution?
Ideas wall	I travel 169 from Downtown Mankato To downtown Minneapolis daily And have experience Safety issues speed limits Bad management And misguided enforcement. Nothing that updating educational manuals along with a global transportation study would and could not solve. The sooner the better please. I'm travelling on one of the nicest sections of highway engineering in the country On 1950 standards.
Ideas wall	The right turn lane from 169 on to Monroe Ave needs to be longer and the alignment with Monroe needs to be adjusted so that the angle is not so sharp.
Ideas wall	Make the areas by LeHiller, Land of Memories Park, and Hwy 68 much more accessible for those individuals/families that live in that area. It is an area that is difficult to get onto/off

	of and not marked as well as it could be. It is a great area for families and has potential for a lot of recreational activities that would benefit the region and vitality/healthy lifestyles.
Ideas wall	The are of HWY 169 where it meets up with HWY 14 could use some updating. It is not very welcoming. More landscaping with trees, bushes, plants etc would be great, The stretch between Mankato and St Peter would I believe also benefit from more trees as well. The area that used to be Dutlers Bowl would be great as a Dave and Busters or as a park area/Rest Stop.
Ideas wall	Having better access to Public Transportation would be incredible. I agree investing in our infrastructure is much needed. Better access to Trains, Busses etc is much needed. We also need to invest in our roadways for Semi Traffic in the area as well.
Ideas wall	When there is high traffic congestion on a highway, this indicates that there might not be enough supply of highway space. Some have said that there are two options to address this. Either: 1) increase supply (invest in highways) or 2) decrease demand (invest in good alternatives to driving on the highway, like better public transit, bike lanes, etc.) I think communities are stronger when they implement option #2. Please make reducing highway demand a goal of this project.
Ideas wall	Traffic lights at Lind and Webster and the neighborhood there
Ideas wall	Please make this corridor regional friendly. I don't like slowing down in St. Peter and I won't like it going through Mankato either.
Ideas wall	It would be nice to put a Truck Wash/Truck Stop/Rest Area off of HWY 169 and HWY 14 Intersection. It is a major gateway for a lot of traffic. Esp with the Fed Ex Facility, the Wal Mart Distribution Center etc in the Mankato area.
Ideas wall	What a great idea! I would be nice to have a way to get between the towns without having to go near the highway exits.
Ideas wall	We need sound abatement, particularly along Blue Earth River. Noise flows over to West Mankato. Plant trees as well as sound bafflers and barriers
Ideas wall	Do not take the house at the end of Range or the one on Nicollet. There is no need to go off the highway that is already there
Ideas wall	This is an easy but expensive solution. Bypass saint peter to the west. Bring 169 down hwy 13. It should go west of north Mankato. Then continue 169 over the minnesota river and have it connect with hwy 60 near or at the exit for hwy 90. Boom. The first loop around mankato would be complete. Anything else would be a huge waste of tax payers money. Getting 169 off the old wagon path and out of the river valley is the right thing to do. The road shuts down too often for floods and mudslid
Ideas wall	The northern most lake Street at WACO should be emphasized and highlighted, not the Happy Chef left turn slot.
Ideas wall	Avoid ped bridges over the highway, seldom used so spend on alternate options. Underpasses should be designed to have full daylight at each end so they have safety from hidden threats—means would raise the thru highway grade.
Ideas wall	Use exit or entrance slip ramps concept where ever needed.
Ideas wall	Cross street should be connected to Butterworth and /or Lind-Range to provide better circulation rather than Range street in front of the motel—maybe even abandon that part of Range.
Ideas wall	Maximizing the R/W width to make an Rcut discussed at the Zoom more workable. Some form or truck friendly roundabout may work, but maintaining non stop or minimal slowdown of thru traffic is highest need. Access is secondary on a main route. These users should expect to stop and wait....

Ideas wall	MnDot and region spent the last 30 years creating 4 lane regional corridors on 169, 60, and 14 for use as regional service routes, cars and heavy trucks. That should remain a priority through this area without the slow down situation that was compromised in Saint Peter. Certainly less than desirable— even if it is “pretty”
Ideas wall	Th 68 onto 169 works very well now.
Ideas wall	Use the Hiniker oxbow for more water treatment and storage than is now. Is pump station adequate? Maybe use the old creek channel behind Year round site for more storage.
Ideas wall	Agree, b it planting trees and limestone won’t service the function like the full cloverleaf would.
Interactive map	[Northern subarea] Vehicles begin to speed up here in anticipation of 65 mph speed limit. Either enforce speed limit or change it.
Interactive map	[Northern subarea] The 50 mph speed limit is ignored.
Interactive map	[Northern subarea] Minimize noise pollution
Interactive map	[Northern subarea] The biggest issue with noise is the trucks using jake braking throughout the Mankato area. Because of the natural amphitheater effect that the valleys provide, truck noise can really be exaggerated. It wouldn't hurt to have an anti jake braking ordinance in the city.
Interactive map	[Northern subarea] Noise is always going to come from traffic.... Move or get used to it
Interactive map	[Northern subarea] southbound exit to 14 west is steep for some vehicles, particularly loaded semi's.
Interactive map	[Northern subarea] Finish the final two cloverleaf's or add fly over ramps on the north side of 169
Interactive map	[Northern subarea] Traffic flow is a huge issue here [Hwy 14 interchange]! It's very hard for vehicles to merge onto 169 when coming off of this off ramp
Interactive map	[Northern subarea] What work is being done to complete the cloverleaf on the east side of the highway 14 and 169 interchange?
Interactive map	[Northern subarea] Short merge zone from 169N to US14 west on bridge.
Interactive map	[Northern subarea] Please continue the acceleration/merge lane that was added eastbound 14 on the bridge all the way to 3rd ave. There are so many grain trucks coming from 169N to 14 E to the ADM plant on 3rd ave that cannot (and do not need to)traffic speed and create a dangerous merging situation. A dedicated acceleration/exit lane, such as the one between 3rd ave and Riverfront would do wonders for traffic flow.
Interactive map	[Northern subarea] A biker/pedestrian bridge here would allow trail users to connect from the North River Trail to the Kiwanis Recreation area and trails on the other side of the river... It would be convenient to connect trails here without having to go to the Veteran's Memorial Bridge. I wonder if it's a project both counties and cities could get behind.
Interactive map	[Northern subarea] We really like the acceleration lane to turn from 14 East to northbound 169 It has been an awesome addition I wish there was better signage to signify that it's there because it seems like some motorists don't understand that they can use it to merge with traffic and sit at median waiting for traffic to clear
Interactive map	[Northern subarea] Turning onto US169NB from US14EB can take extremely long times during even moderate traffic, due to uncontrolled, constant traffic on US169SB combined with solid 'pulses' of traffic on US169NB from signal at Lind St.
Interactive map	[Northern subarea] Northbound 14 has to cross 169 traffic

Interactive map	[Northern subarea] Left turn battling traffic and nearby traffic light [EB Hwy 14 to NB Hwy 169]
Interactive map	[Northern subarea] Merging from US14EB onto US169SB dangerous due to sight angles and high-speed traffic in US169 without acceleration lane
Interactive map	[Northern subarea] When I lived up north & commuted, this [Hwy 14 interchange] was the scariest intersection. Crossing south bound 169 to get to north bound [Hwy 169] is a gamble for an accident. Gauging traffic flow is difficult. Had to be very vigilant to gauge if traffic is accelerating or slowing for a light. Watching out for big trucks was especially troubling. Now that I live in North Mankato I avoid this intersection & therefore avoid businesses in that area of 169.
Interactive map	[Northern subarea] speeds too fast with all the hwy 14 merging and businesses along this stretch to the dog park
Interactive map	[Northern subarea] The congestion can be troublesome. We need better access for those coming from areas such as New Ulm, Gaylord etc. In order for our communities around us and for Mankato to Thrive we need to make sure that this access point is easier to enter and exit. Also Hwy 14 needs to be widen to 4 lanes as far as possible for safety concerns.
Interactive map	[Northern subarea] I've had people cut me off many times from the left lane trying to grt onto Hwy 14 east.
Interactive map	[Northern subarea] Adding a right turn lane onto North 169 that goes all the way to the off-ramp to east 14 would be great Similar to what is at the intersection near Culver's between commerce and 14
Interactive map	[Northern subarea] It would be great if this intersection [Lind St] was safer for pedestrians. It is the only way someone could travel from the river trail to Hiniker/lower North Mankato.
Interactive map	[Northern subarea] How about a round-about here [Lind St]?
Interactive map	[Northern subarea] Lights cause major traffic flow problems. Those trying to go straight across 169 are in fear of being hit by those turning onto 169
Interactive map	[Northern subarea] Hard to cross the highway with a bike
Interactive map	[Northern subarea] business (mcdonalds, kwik trip) trafifc flow is dangerous at ramps and the merge areas are short distance. traffic speeds of 50mph are too fast for these areas. the lind st traffic light is too short for bikes/pedestrians
Interactive map	[Northern subarea] Merge lane is too short when traveling from eastbound 14 to southbound 169
Interactive map	[Northern subarea] Turning left onto 169 from Lind is especially troublesome without left turn lanes and traffic arrows.
Interactive map	[Northern subarea] 50 mph is fine here but needs enforcement
Interactive map	[Northern subarea] Add the "left turn on green arrow" lights to the traffic signals on Lind Street.
Interactive map	[Northern subarea] Move Lind St intersection here [River Ln] as a grade separated interchange.
Interactive map	[Northern subarea] Lights are not synched
Interactive map	[Northern subarea] too bad semis cannot be re-routed from the dog park until minneopa, if they are just "passing though" this area...speeds are too high, jake-braking (?) too loud, run lights often
Interactive map	[Northern subarea] Traffic turning east on 14 blocks through traffic for 169 north

Interactive map	[Northern subarea] traffic from [Webster Ave] Light will back up onto Range St as you can not make the right turn.
Interactive map	[Northern subarea] This spot often gets over crowed when there are vehicles waiting to cross 169. Sometimes the vehicles even block the intersection of Range Street and Webster Avenue.
Interactive map	[Northern subarea] It would be great if the light at speedway and the light at QuikTrip could be better timed so that you wouldn't get stopped at both
Interactive map	[Northern subarea] How about a round-about here [Webster Ave]?
Interactive map	[Northern subarea] Webster should be rebuilt as a grade separated full intersection. Business access can still be maintained
Interactive map	[Northern subarea] Trying to bike to the Kiwanis trails or river trail can be difficult and dangerous at either of the stop lights along Webster Ave and Hwy 169 or W Lind St, especially with children. Having a discussion about creating a safer way to access this area might be a conversation worth having.
Interactive map	[Northern subarea] Webster Ave. is a vital gateway from Hwy 169 into lower No. Mankato. Many area businesses rely upon it for large truck service access, not to mention residential, park/ recreational, and municipal service garages. The Webster Ave. - Hwy 169 interchange must continue to be a full access at-grade intersection. Easy onto/off-of Hwy 169 at Webster Ave. into lower No. Mankato must be maintained for large trucks.
Interactive map	[Northern subarea] Local business interests long ago put up a fight to preserve traffic lights on what should have been a limited-access highway, long ago removed from the old downtown Front Street.
Interactive map	[Northern subarea] This really applies to all traffic lights on 169 through Mankato/North Mankato. Many traffic lights are not sensitive enough to detect motorcycles such as at Webster Ave. You may not get a green light at all or until more cars pull up behind you when entering from Webster or at Webster left turn lanes from 169. You are either forced to break the law and proceed or come up with some other risky maneuver.
Interactive map	[Northern subarea] The traffic from 169 is extremely loud in this area of the neighborhood
Interactive map	[Northern subarea] Sound barriers would be beneficial- people cannot use their outside spaces- cannot carry on a conversation outside
Interactive map	[Northern subarea] traffic lights are too short to turn onto hwy 169...left turn onto hwy 169 is the same as going straight - backs up traffic on webster and range, especially congested during peak hours (7-9am and 3-6pm), plus all the semi traffic - scary and too fast, especially in the winter road conditions. people run the hwy 169 lights a lot along this entire stretch from the veteran's bridge to dog park on hwy 169. dangerous for kids on bikes and pedestrians if they want to access the river trail
Interactive map	[Northern subarea] For years I have often wondered why there wasn’t a direct connection between Highway 169 and Madison Avenue. How about a bridge? It would seem like an easy fix to alleviate traffic concerns off of the dreaded Third Avenue to Riverfront Drive intersection and you could run a road tied into a Madison Avenue bridge/road (behind the Pizza Hut, etc.) or some semblance of that. I realize bridge projects aren’t cheap, but this would dramatically improve the viability, visibility and access (from 169)
Interactive map	[Middle subarea] There is excessive traffic congestion on the bridge around 5:00 p.m. when drivers are going East on Belgrade Ave. and turning onto 169.
Interactive map	[Middle subarea] Belgrade Ave is the normal way I cross 169, but I avoid the area during rush hour times. Because 169 is so congested I avoid driving on any part of it. This keeps me away from businesses along the corridor.

Interactive map	[Middle subarea] A bike lane over to Belgrade from Mankato on the bridge.
Interactive map	[Middle subarea] adding color to the flood wall on the far side of the river would improve the aesthetics of the corridor
Interactive map	[Middle subarea] Poor pavement condition on lookout/center St exit ramp
Interactive map	[Middle subarea] Curves can be scary when roads are slick and people speeding. Lots of people drifting over the centerlines in general.
Interactive map	[Middle subarea] There are nice views of the river going southbound on 169.
Interactive map	[Middle subarea] lookout drive as a freeway feels overbuilt. more of a parkway feel, with landscaping, and bike trail connecting to bike facilities in upper north, lower north, judson bottoms, and trail over river bridge would be nice
Interactive map	[Middle subarea] sidewalk and trail should be wider [North Star Bridge]
Interactive map	[Middle subarea] Merge lane from riverfront drive sometimes causes safety issues with NB 169 traffic trying to get to right to get on lookout drive exit lane.
Interactive map	[Middle subarea] Make this [NB Hwy 169 on-ramp from Riverfront Dr] a two lane all the way to the top to allow more cars on this access road and get more cars off of Riverfront. 169 access form Riverfront street
Interactive map	[Middle subarea] The stoplight on the SB 169 exit onto Riverfront strongly favors Riverfront traffic over those coming off of 169. There is always a build up of traffic here.
Interactive map	[Middle subarea] Certain times of the day make this [Riverfront Dr to NB Hwy 169] route really time-consuming and frustrating. Particularly around school start/release times for West HS. Some mornings traffic is backed up all the way back to Lookout Drive.
Interactive map	[Middle subarea] turning right on to 169 south from River front dr is fairly difficult, especially with any type of trailer.
Interactive map	[Middle subarea] There is poor access and visibility to the businesses that are located on South Riverfront Drive.
Interactive map	[Middle subarea] The traffic light is red for too long when exiting hwy 169 south onto south riverfront near West High School. It was changed over the last several months, it previously turned green soon after stopping, now there is a 1-2 minute pause even when there are no cars on south riverfront
Interactive map	[Middle subarea] The approach panels on most of the bridges need to be changed to provide a smooth ride.
Interactive map	[Middle subarea] Improvements to Minneopa Trail entrance from S Riverfront Dr onto US169-paired bridge over Blue Earth River make access easier and safer
Interactive map	[Middle subarea] along hwy 169 (heading south) after the ramp near the soybean mill- any turn-off areas, even with merge lanes/separate left turn lanes (to le hillier, land of memories), is very scary - speed limits are ignored - simply too fast period.
Interactive map	[Middle subarea] I like this exit off of 169 [NB Hwy 169 to SB Riverfront Dr]
Interactive map	[Middle subarea] Minimize noise pollution
Interactive map	[Middle subarea] Noise is always going to come from traffic.... Move or get used to it.
Interactive map	[Southern subarea] Poor drainage west of the South Bend Ave intersection between LeHillier St. and 169. Water stands in the ditch and has to be pumped. If water is not pumped it will eventually run into the residents basements on LeHillier St.
Interactive map	[Southern subarea] This [Hawley St/County Rd 69 intersection] is an awful intersection and I try to avoid it if at all possible.

Interactive map	[Southern subarea] This intersection [Hawley St/County Rd 69 intersection] is problematic. It's not always easy to see the traffic from the south, and the speed of the oncoming traffic is at times too fast to react to cars pulling out and onto the highway.
Interactive map	[Southern subarea] I don't think the merging lane is long enough to get on to 169 north and this is an area where pedestrians cross to get to the bike path. A pedestrian over pass would be beneficial for safety.
Interactive map	[Southern subarea] This [Hawley St/County Rd 69] intersection is not safe, especially when vehicles are turning off of 169 and heading towards Southbend Ave.
Interactive map	[Southern subarea] This [Hawley St/County Rd 69] can be a dangerous location for crossing the hwy. Myself and many I have talked with agree we need a pedestrian walkover or Ped. Bridge over hwy 169.
Interactive map	[Southern subarea] The Shoulders are too narrow along this [County Rd 69] portion of the road for bicycles and pedestrians.
Interactive map	[Southern subarea] There is a lot of speeding that goes on in this area when coming into Mankato when the speed limit reduces to 50 mph.
Interactive map	[Southern subarea] There is a lot of speeding in both the northbound and southbound lanes. The speed limit is 50 MPH for safety reasons. Law enforcement needs to increase enforcement on this section of roadway.
Interactive map	[Southern subarea] There were posts put up in the [County Rd 33/Hwy 169] median, but when turning left off off of 169 south, the grass gets tall it is difficult to see cars and especially motorcycles.
Interactive map	[Southern subarea] Although one side of the road [County Rd 33] has been given a wider shoulder, the entire roadway along the hill needs to be reconstructed, mostly due to this being a major Ag. Trucking Route.
Interactive map	[Southern subarea] I would like to see a round about built at the intersection of Hwy 169 and Hwy 68. That intersection is very dangerous!!!
Interactive map	[Southern subarea] Easier access from HWY 68 to 169 for cars and Semi Trucks. Better Pedestrian and bike accessibility.
Interactive map	[Southern subarea] This is a dangerous crossing when stopped on Highway 68 turning left onto Hwy 169 east from Minneopa area. Cars drive too fast and it is very risky when traffic is heavy. Traffic should be reduced to 55 mph for 169 traffic and a blinking hazard light added to warn 169 traffic to cars trying to cross both lanes when turning left (east).
Interactive map	[Southern subarea] Warning signs for approaching traffic would help [at Hwy 68/Hwy 169 intersection]. Speed limit should remain unchanged.
Interactive map	[Southern subarea] The US 169 & MN 68 intersection is dangerous when making a left turn from MN 68 onto northbound US 169. I think the speed limit should be held to 50 MPH until the intersection with CSAH 90, then go to 65 MPH. Also the intersection of US 169 & MN 68 should be changed to the R-Cut or J-Turn type intersection, so to reduce the severity of motor vehicle crashes.
Interactive map	[Southern subarea] This seems like a good location to put a flyover for Hwy 68 traffic, or perhaps a new intersection similar to what was done at Hwy 41 and 169 in the Chaska/Shakopee area.
Interactive map	[Southern subarea] There needs to be a stop light at Hwy. 169 & 68 Intersection. There have been to many accidents and deaths at that intersection.
Interactive map	[Southern subarea] Highway 60. Access to trail from near the golf course would be great for regional connectivity. Also would connect south to Highway 90

Interactive map	[Southern subarea] Large rv and commercial buildings here with lots of travel trying to get both directions
Interactive map	[Southern subarea] Consider moving highway 68 intersection to a location where a safer intersection or interchange could be constructed
Interactive map	[Southern subarea] People [on NB Hwy 169] don't yield to Hwy 60 traffic and cut folks off.
Interactive map	[Southern subarea] Could use a longer acceleration lane for truck traffic coming from northbound US 169 onto northbound MN 60 / US 169.
Interactive map	[Southern subarea] North bound 169 to westbound 60 could use an acceleration lane
Interactive map	[Southern subarea] Better lighting at this [Hwy 60/Hwy 169] intersection would be great. Many times when dark or poor weather it is very hard to gauge the traffic due to the highs and lows of the road plus glare from the headlights.
Phone call	Maintaining access to 169 from Webster Ave is important for businesses and business opposes a potential closure of the intersection of 169 and Webster. He said the value of his building is directly related to easy and direct access to 169. If there are efforts to close the intersection of 169 and Webster, he and about 15 other businesses will bring suit against the government entity…if anybody screws with that intersection, a price will be paid.
Email	I believe this [Webster Ave] intersection critical for many businesses, including mine. While it may not be as critical for the businesses on the EAST side of the 169, there are far more businesses and residences on the WEST end that will be negatively impacted. I would advocate for a roundabout, or other traffic solution vs shutting that intersection off completely. I believe shutting off that intersection will cause log jams at the other inlets and outlets to 169 (Belgrade for example or the Kwik Trip intersection (that one is scary enough now, I can't imagine it with MORE people trying to get in and out there). Please consider keeping that intersection open. Easy on and Off.... Why make it harder for people to get to brick and mortar businesses who are already struggling??
Email	I just want to make sure the state truly looks at our needs and takes it all into consideration. I'm not a fan of "J-Turns". I get into an accident almost daily on 169 J-Turns and people that don't use the speed lanes properly and just cross in front of traffic to get to their turn-back.
Letter/email	Dear Mr. Androsky, We are a group of more than 25 businesses and property owners who rely on the Webster Ave. – U.S. Highway 169 intersection that gives access into North Mankato. For over 50 years, the access from Webster Ave. onto/off-of Highway 169 has been the vital linkage for transportation to our storefronts. Without this full access intersection, businesses would suffer financial losses in operations, property values, and in our business values. We are fearful that many businesses would perish, resulting in job losses. This intersection is also a primary gateway to northside residential neighborhoods, schools, churches, day-care centers, parks and municipal service garages. Closing this intersection would negatively affect these citizens as well. The businesses in our neighborhood provide a diverse set of offerings, to include freight transportation, trucking services, retail, distribution, light industrial, office, hotel and entertainment. Large truck (semi) access to and from our neighborhood businesses are critical. We are writing to express our strongest support in keeping the Webster Ave. - Highway 169 interchange a full access at-grade intersection. We as a group will always attempt to put our best foot forward when dealing with any level of government, but please understand, we are deeply united on our position. We are prepared to protect our long-held interests in

	having todays access from the Webster Ave. – Highway 169 intersection, to whatever level is necessary, including litigation
	The talk of closing the intersection at Webster and Highway 169 is not good news for us. We are the property owners of 2 buildings on Webster and operate our business there too. We also have tenants. We have worked hard to keep our property updated and inviting to those who enter North Mankato at this gateway. Our location is visible to traffic, customers can easily enter and exit our parking lot and its easy to explain our location. Closing off the intersection would hamper our ability to further develop and grow our business. 18 years ago we purposefully picked this location. We designed and built the building on the corner. We invested here because we thought it was a great corner and projected this area of town was ready for more development. It has not happened as quickly as we would like but opportunity to everywhere here! We neighbor with several independent, hardworking businesses who deserve to have this intersection open to allow customers easy access. Keeping the intersection open will fuel more growth and vitality to this part of town and insure those who come to Mankato-North Mankato from the north and south will be impressed as they travel here instead of missing all the opportunity that will be gone from sight if you close or re-route this intersection. As this discussion unfolds MAPO need to know business here is real, working hard and wants to grow and improve this area – not make it a forgotten part Of town. We strongly support keeping this intersection open for not just our business and success but for those that surround us. THANK YOU.
Phone call	[Reconstruction] been a big need for 30 years. Running a road by a river is never conducive.
Phone call	I think the speeds on 169 are too fast. I think they should wait until they get past the 169/60 junction before the speed limit is switched to 65 miles per hour. There's a lot of traffic. With Sibley/Land of Memories Park, I have to go uphill and fight traffic that's already gunning it and it's hard to get over into the left lane. I have to make a left-hand turn off of 169 up by the Hillcrest area. If I'm doing the speed limit, people are already going fast (near the Spur station). I'm not going to accelerate just to go two blocks. I made this comment years back, and a guy on his bicycle got killed in that area shortly after I made the comments. I had recently called the DOT about some guardrails between the northbound/southbound lanes. As I drive at the top of 169 by Hillcrest the guardrails block by vision. I drive a low car. The guardrails block my vision all year, grass grows in between the guardrails in the summer and often the grass is not mowed, further obstructing my vision. It's uncomfortable to have obstructed vision with cars going 65 mph. Overall across entire corridor, pedestrian safety is a concern. If you're trying to get across it, there's nowhere to cross safely. They took the crosswalk away from McCauley St. The people that live over there all cross at that point to get to the gas station. Trying to get across at Hillcrest is dangerous in car and on foot. Possibly take a look at constructing a parking lot for people using the trail. If West Sibley has access to the trail, consider making a parking lot there so people could park there as they go on the trail.
Comment form	Building elevated Highway all the way through town no stop lights no stop signs ramps to go up and down easy peasy never have to worry about flooding
Comment form	I really think the off ramps and on ramps where 169 and 14 meet up should be redone. They're very dangerous in the winter and semis have tipped over due to them

Comment form	northbound 169 coming into Mankato, the speed limit drops to 50mph at the top of the hill just before oing down. Almost all the trucks come speeding right to the sign then hit JAKE brakes all the way down the hill to Southbend ave. at whitch time they and cars are still speeding past the intersection. The people living on the hill have to listen to countless jake brakes 24 hrs a day! There is no noise ord or sign so they just keep it up. I think as a possible sulution might be to move the speed limit change bact to Hwy 68, so that traffic has calmed itself to 50 before they hit the hill and post noise limit signs. Thank you
Comment form	I have been traveling this route every day from the metro to Mankato and have experienced the full impact on how important it is to maintain on how safety first, fast and convenient 169 has become. I am a 2 lane witness in admiration.
Comment form	A few thoughts: The pedestrian walkways on the bridges from 169/S. Riverfront section into N. Mankato and S.Riverfront by CHS into South Bend are pretty narrow and fill with debris from the highway fairly easily. They are also pretty difficult to maintain in the winter months in regards to snow removal. If there are plans for improving these sections for pedestrian/bike traffic they should include solutions for safe clearing of snow. I have encountered many people while plowing/blowing snow on the bridges and people will jump the barrier onto the highway because there isn't enough room for the human and the equipment on the path at the same time. There is much more to say on the subject, but I'll keep it short. Thanks.
Comment form	Just curious. I know the map is pretty general,but it looks like it's going over my house.
Comment form	What changes are suggested?
Comment form	I still think there should be more thought into connecting 169 and Madison Ave. Using Madison and Monroe as the Bridge location over the MN River..
Comment form	Eliminating the cross roads / with current Stop lights would cause extensive challenges for truckers to get to the multitude of businesses off of 169. It would cause traffic to go via alternate locations which would cause delays, traffic jams, pollution to residential areas and damage to city streets not made for the weight and usage of additional traffic. It would ultimately cause the area to look like Belle Plaine and the unrecoverable damage done to those businesses. The couple of minutes possibly saved by going around the current situation is not worth the millions of dollars spent on redeveloping this area or the millions of dollars lost to the current businesses
Comment form	My only concern is at the far west end near 169 & 60 South, and the truck crossing entrance to our Mankato branch.
Comment form	There needs to be a stop light on 169 & 68. There has been to many accidents and deaths at that Intersection. People are driving 70 MPH when coming up the hill by Hillcrest.
Comment form	I am concerned about the area around the Veterans bridge, Belgrade and entering/leaving 169. I live on Belgrade Ave near Range St. I walk or bike to the hiking path or Mankato fairly often. Widening the sidewalks over the bridge really helped. While I am careful and stay back as much as I can, the on and off ramps can be dangerous for pedestrians.
Email	My concern, even with the recent improvements, the continuing danger of the 169/68 intersection. Increased safety can be achieved by increasing the speed limit from 50 MPH to 65 MPH, on the westbound lanes, AFTER the intersection and decreasing the speed limit, from 65 MPH to 50 MPH, on the eastbound lanes, BEFORE the intersection.
Email	I live on Stewart st in north Mankato. 169 is my neighbor across the street. Question, is there any talk about noise reduction for the people in my area? We did have trees planted 10-15 years ago and that helped some but maybe something more could happen. Question 2 , the chain linked fencing ... I'm not a fan of, why is it there and can they get rid of it? It looks terrible and is in poor shape. The weeds and trees grow in the fence and makes it look bad. Just my 2 cents worth I'll be watching the zoom meeting tonight, thanks.

Comment form	Our business, near the junction of 60 & 169 South, concerns is to maintain a safe access for our trucking customers and employees that arrive from both directions. Short term, it might make sense to install flashing yellow overhead or shoulder sides, reduce speed as trucks cross. Another option would be to add an acceleration lane for both directions. There are other businesses on both sides of our immediate area that may also have suggestions
Comment form	Raise the speed limit please. Tired of getting tickets for doing 70 when everyone else is doing the same.
Comment form	Hi there, I missed the meeting the virtual open house but wanted to submit some quick input if still possible. We live across from Minneopa Golf Course. Here are the top 3 things we'd like to see come from this study. 1. A bike path along the south side of 169. Also, you could connect bike trails along hwy 90 with the bike trail on hwy 169 by creating a trail near or along Pintail Street. 2. A pedestrian overpass/bridge either at the Lehillier intersection or at Hwy 68. 3. Better options for getting on/off 169 from the south side. The intersection at 169 and Lehillier gas station is horrible. The on ramp is especially dangerous with how fast traffic flows on 169. Thank you! We really look forward to participating in this study and to any ideas and improvements that take shape.
Letter	Please consider sound abatement, particularly near Blue Earth River, as sound magnifies in west Mankato. Consider tree planting as well as physical barriers.
Social media	Put ramps in and take out stop signs and lights
Social media	The rumor is the state wants to put roundabouts through the city of Mankato/North Mankato on 169 does are suggestions even matter more than likely not
Social media	The area at the quick mart(?) station going toward the nursing home, that whole area of 169 needs many improvements.
Social media	PU-LEASE!!! No more ROUNDABOUTS!
Social media	a roundabout at the junction of #160 and #60 might be OK, but they are too close together in Mankato, stupid
Social media	You should bypass North Mankato somehow. It gets congested with the stoplights, many turn lanes and on/off ramps. Also the left turn to get into Southbend needs fixing
Social media	Create a bypass from north of st. Peter to south of Mankato
Social media	At the junction of 169 south and BEC 90 needs to be completed with the planned cloverleaf exits. It is the best exit to get into the Southbend area. Both these roads have increased in vehicles steadily since I moved here 20 years ago! This intersection, as is, can be dangerous in not perfect weather conditions.
Social media	I have learned they ask for our opinions but they already know what they are going g to do. They are just trying to make us feel included and really don't care what we think!
Social media	Please put a stop to this.. there is absolutely nothing wrong with whats already there... and tbh the state doesn't take care of the whole section anyway. Im embarrassed for the travelers coming to mankato or thru mankato/north mankato that have to see the lack of care. Imo, i think this is just a waste of time and money for something that is not needed. I could think of thousands of other things that money could be used more beneficial for.
Social media	Seems to me the problem is not so much the road but some of the people driving on it. Many need a good driving refresher course.
Social media	There is a reason so many cities are adding round abouts. They are safer and way more efficient. Personally I hate traffic lights. 9 times out of 10 I am sitting at a red light with no traffic. Its so pointless.
Social media	it would be nice if they would figure out a way to keep the plows from getting stuck on roundabouts. Happens by my place every single year since they put in the roundabout

Social media	Round Abouts ARE NOT SAFER I've had more close calls in those STUPID Round Abouts from 4 wheelers not yielding like their sappose to and they NEVER make them big enough for big trucks with out running up on them
Social media	Not a problem with the roundabouts, it's a driver problem. And they are designed for trucks to run up on them.
Social media	Reroute north/west around North Mankato.
Social media	Nothing wrong with it. Spend money on something else
Social media	ROUNDABOUTS are so OVERUSED!!! Sick of it.
Social media	Finish highway 14 to New Ulm first. Save lives before congestion
Social media	I've seen plans to replace the 169-14 interchange with a proper cloverleaf intersection. Too many accidents when drivers have to cross lanes. McDonald's would have to go for a cloverleaf.
Social media	Anybody east bound on 14 wanting to go north on 169 has to cross southbound 169 traffic. Likewise, anybody northbound on 169 wanting to go west on 14 has to cross traffic on southbound 169. I've seen a lot of accidents there, I work near there. A proper cloverleaf would eliminate haveing to cross any traffic lanes or stopping at all.
Social media	Stick to roads. Bike riders are scarice.
Social media	Build an elevated Highway all the way through town one long continuous Bridge on and off ramps no stop lights. All projects like this would be paid by the government. If they can build a road across Lake Pontchartrain. This is a easy project. I will draw the plans for free. Yes I'm a Architectural Engineer. What is your idea? What are you willing to do for the project. What is your relationship with this project. Maybe a rail system also to the cities. Hook it up with the finished Hwy 14 project and the by pass around St.Peter. it just an idea.
Social media	Flow could definitely be improved, and there are a few danger spots. I was almost killed at one. Stop lights are gas guzzlers and time-wasters
Social media	The interchange of 169 and 14E in Mankato/N Mankato . Many drivers need to go N on 169 off 14 E. The cheapest, best and easiest solution to this bottle neck dangerous situation is a “fly over” lane from 14E which then merges with 169N No land need be purchased. No businesses displaced. The example exists on 494 W flying over to 169 S in Bloomington. It works and works very well.
Social media	Increase the speed. No reason to be 50 mph
Social media	It is a real challenge to get out of highway 68 at times
Social media	Change something about the southbound left turn lane right after the quick mart
Social media	Build a belt loop around both cities.
Social media	Some fly over designs (ie at 169/41 in Shakopee) work really well and that may be an option. We cannot keep it “as is” due to speed limit lack of enforcement. Some people are flying through at 70 MPH and others are following posted speed limits, which makes it dangerous. Unless someone, whether it be MPD, NMPD, Blue Earth County, Nicollet County, or State Patrol, takes ownership of enforcement, it’s only going to get worse until someone is seriously injured or killed.
Social media	Need to raise the elevation of the turn lane on 169 North to 14 West. Hard to see what’s coming at you.
Social media	Have ppl slow down! Vast majority of drivers are going 60 in a 50 and get really angry, even if you go 55.

Social media	for some that may have been traveling the 4 lane for some time, they aren't seeing reasons to slow down therefore their mind stays on auto pilot and don't notice the speed sign. The only area that has obvious reason for a slow down is once you get close to the stop lights. The entire stretch to the west of the lights is the same old four way as it is to Lake Crystal. For outsiders, they may not even notice they have come upon a town yet
Social media	Put up a sound wall along 169 as it passes threw Mankato so we are deafened by traffic anytime we try to use the river.
Social media	Shut it all down and make people walk uphill both ways like in the old days.
Social media	Stay east of the Minnesota river at LeSeuer.
Social media	Why even bother, the state will do exactly what they want to do. Pretty sad state of being that we have these days.
Social media	Improve the ramps to 14. Crossing traffic is not safe nor are the slopes of the ramps
Social media	Passenger trains that were supposed to be built on 2008
Social media	Some kind of interchange is needed at Hwy 68. Increasingly dangerous as traffic increases. Many tanker trucks access the tank farm near there. I didn't see that intersection addressed in the plans
Social media	Keep it the same stop looking for ways to blow money. It's been working just fine for years.
Social media	your going to do something even if it needs nothing but please dont fill it with roundabouts
Social media	Finish hwy 14 first. Seriously. Or widen hwy 60.
Social media	I think that Widening HWY 60 would be a great plan. I think HWY 14 should be a 4 lane as much as possible with as much as its traveled
Social media	MnDot will screw it up, like not putting acceleration lanes in j-turns. On that note, a St. Peter bypass would be nice.
Social media	Could use a 6 lane at least between the Highway 14 bridge and the Memorial Bridge. Gets pretty congested there with all the semi traffic.
Social media	Noise pollution. Please do something to minimize 24 hour noise
Social media	walls help with both pollution and noise
Social media	Why do you keep looking for ways to spend highway dollars for bike lanes or trails when we have a trail/walking trail already? Maintain the roads we have and finish hwy 14
Social media	Mankato trying to act like they want people's' opinions.. believe me the outcome is already decided they plans already drawn up they are just pandering to the public as usual.
Social media	Is it necessary?
Social media	Webster Avenue MUST remain open, for the many businesses in that area!
Social media	Webster and Hwy 169 needs to remain a full function access intersection at grade where one can go North, South, East and West, from and too. That intersection is North Mankato's farthest North intersection and has to remain within the boundary of North Mankato. North Mankato's City Council has drafted, a few years ago a resolution that states that the Webster & Hwy 169 intersection needs to remain a full function at grade intersection. If the intersection is moved north it has to remain within the boundary's of the City of North Mankato even if that means Mankato transferring ownership of land to North Mankato to make that intersection within the boundary's of North Mankato. North Mankato needs to maintain control and ownership of that intersection, that cannot happen if that intersection lands in Mankato's city boundary's.

Social media	Post "No Jake Braking" signs, the truckers need to stop this noise pollution!
Social media	We need fast electric trains not more roads to Create pollution
Social media	Restricted crossing U-turn intersections. Ex: north end in St Peter or at Hwy 14/Cty 17. To be installed in lower N. Mankato, replacing or lessening the impact by traffic signals.
Social media	Three lanes no stop lights
Social media	STOP MAKING ROUND-ABOUTS!
Social media	Just no roundabouts please
Social media	Round abouts are so much safer and more efficient than traffic lights.
Social media	More roundabouts. 3 lanes wide. Increase speed limit to 85mph.
Social media	Please, no more roundabouts!
Social media	NO MORE ROUNDABOUTS !
Social media	A waste of tax payer money
Social media	Waste of time and money
Social media	More wasteful spending
Social media	NO ROUND ABOUTS.
Social media	Semi drivers hate them [Roundabouts]
Social media	Please, no more roundabouts!

Hwy 169 Corridor Study Phase 2 Engagement Summary

8/30/2021

Overview

The purpose of the second phase of public engagement for the Hwy 169 Corridor Study was to share the draft design concepts with the broader community and collect feedback on what people like and dislike about the designs. The phase occurred between June 15, 2021 and July 12, 2021. Figure 1 includes a summary of the engagement strategies used.

Photo from Songs on the Lawn

Figure 1: Phase 2 Engagement activities

Date	Strategy	Description	Participants
June 15, 2021	Focus groups	Two focus groups with businesses adjacent to the corridor	16
June 23, 2021	Online meeting	Public meeting via Zoom videoconference	40
June 23 – July 12, 2021	Online open house website	Website with comment form and interactive map	316
June 24 & June 28, 2021	Pop-up events	Tabling at Songs on the Lawn in Mankato and the North Mankato Farmers Market	Approx. 80
June 15 – July 12, 2021	Email, phone call, or letter	Comments submitted via website comment form, email or phone call	8

Focus groups

Two focus groups were held on June 15, to collect feedback from businesses adjacent to the corridor. The focus groups were organized by businesses location in the three corridor subareas (i.e., north, middle, and south). The middle and south subareas were combined into one focus group. Businesses were invited through direct mail and email. Sixteen business representatives participated in the focus groups.

Online meeting

An online meeting was held via Zoom videoconferencing on June 23, 2021 at 5:00 p.m. During the online meeting, participants were divided into two breakout rooms based on which subarea they were most interested in and they asked questions and provided feedback on the draft design concepts in their subarea. The middle and south subareas were combined into one breakout room. Forty people attended the online meeting.

The meeting was promoted through a variety of methods including:

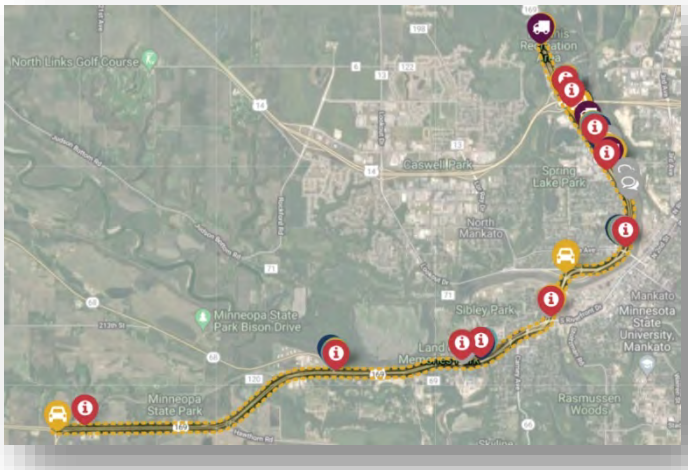
- **Project website** was updated with online meeting information and other engagement opportunities
- **Social media posts and ad** published on MAPO's Twitter account and MnDOT's Facebook account
- **Email blasts** were sent to project email subscriber list
- **News release** was sent to local media outlets
- **Project partners** (i.e., cities and counties) shared information with their networks

Online open house website

The online open house website was active between June 23 and July 12, 2021. The website shared the draft design concepts on an interactive map, and participants could provide feedback on the designs by placing a pin on the map or submitting a comment form. The website was promoted through the same communications methods listed above for the online meeting.

There was a total of 316 unique visitors on the site. There 69 comments on the interactive map, and 11 comments submitted through the comment form.

Online interactive map



Pop-up events

Project staff tabled at Songs on the Lawn in Mankato on June 24, 2021, and North Mankato Farmers Market on June 28, 2021. Pop-up participants reviewed the draft design concepts on boards and provided feedback directly to project staff. Staff spoke to approximately 45 at Songs on the Lawn and 35 people at North Mankato Farmers Market.

Photo from North Mankato Farmers Market

Email, phone call, or letter

Between June and July 2021, eight people provided feedback to project staff through the website comment form, email, or phone call.

Highlights

The key highlights from comments are summarized below:

- **North segment** (Lake St to Belgrade in North Mankato and Mankato)
    - Many supported constructing a full cloverleaf interchange at Hwy 14, and some supported constructing a diverging diamond interchange.
    - Mixed support for roundabouts at N River Ln and Webster Ave and interchanges at Hwy 14 and Webster Ave.

    - Most people supported the Range St concept that keeps the intersection open to Webster Ave.
    - Some businesses expressed concerns for their economic viability with the proposed concepts that close Lind St and N River Ln.
    - Many people supported the proposed pedestrian and bicyclist crossing improvements in the north segment, and most people preferred the crossing north of Lind St.
- **Middle segment** (Belgrade Ave/Veterans Memorial Bridge to Blue Earth River crossing in North Mankato and Mankato)
    - Many supported the pedestrian improvements concept at Belgrade Ave/Veterans Memorial Bridge compared to the roundabout concept.
    - Some support for the Riverfront Dr signalized corridor and right turn lane concepts; however, few people provided comments on Riverfront Dr.
    - Some people said that merging at Lookout Dr and Sherman St before getting on southbound Hwy 169 is unsafe because there is no clear indication of which road has right-of-way and which should yield.
- **South segment** (Blue Earth River crossing to Hwy 60 in Mankato and South Bend Township)
    - Many people supported the proposed pedestrian and bicyclist improvements in the south segment and most people preferred the Hawley St pedestrian bridge concept.
    - Some people supported the proposed County Rd 33 Green T design concept compared to the Hawley St Green T design.
    - Many people expressed support for the proposed acceleration lane from Hawley St to eastbound Hwy 169.
    - Many people said that they like the proposed High T at Hwy 68.
    - Some concerns that the proposed Reduced Conflict U-Turn (RCUT) at County Rd 120 will not address the acceleration challenges for trucks turning onto Hwy 169 from County Rd 120.
    - Some support for the County Rd 69 RCUT concept if turns are wide enough for truck and trailer turning movements.

Comment Summary

The following sections include summaries of the public comments collected during phase two engagement, by segment and intersection. For a table showing all comments, see Figure 3.

North Segment

The north segment is between Lake St and Belgrade Ave in North Mankato and Mankato.

Hwy 14

Many people supported the draft design concept with a full cloverleaf interchange at Hwy 14. People said the Hwy 14/Hwy 169 interchange has a lot of traffic from residents driving between home and work in Mankato and North Mankato and regional traffic that is looking to get through the corridor quickly. Many stated that a full cloverleaf would ease traffic flow the best out the proposed design concepts. However, businesses expressed concerns for their economic viability if access is removed at N River Ln and Lind St for the full cloverleaf concept. Some people supported constructing a diverging diamond interchange because

it had the highest evaluation score. People who did not support the diverging diamond interchange were concerned about the traffic lights restricting traffic flow and increasing risk of collisions.

N River Ln and Webster Ave

There was mixed support for the proposed concepts with roundabouts at N River Ln and Webster Ave and interchanges at Hwy 14 and Webster Ave. People who supported the interchange concept said the design would allow through traffic to get through the area quickly, and people who supported the roundabouts concept said roundabouts would maintain easy business access while also improving traffic flow in the area. Many people opposed the traffic signals and RCUT concepts at N River Ln and Webster Ave. People said the traffic signals concept would have the same congestion issues as the existing traffic lights at Lind St and Webster Ave, and the RCUT concept is confusing for drivers and challenging for a truck and trailer to make the turning movements. Additionally, some businesses expressed concerns for removing access at Lind St with the proposed N River Ln and Webster Ave concepts because they could lose customers.

North segment

Range St

While few people provided feedback on the Range St concepts, most said that they like the concept that keeps the intersection open to Webster Ave since this design would maintain direct connections to Range St businesses and be easier for people unfamiliar with the area to navigate.

Pedestrian and bicyclist connections

People who provided feedback on the proposed pedestrian connections in the north segment commonly supported a crossing north of Lind St to provide a direct connection from North Mankato neighborhoods to the trail adjacent to the Minnesota River.

Some people expressed concerns for pedestrian and bicyclist safety crossing at roundabouts and some people said they support constructing a pedestrian bridge in the north segment so pedestrians and bicyclists can safely cross Hwy 169 without crossing in front of car traffic.

Middle segment

The middle segment is the area between Belgrade Ave/Veterans Memorial Bridge and the Blue Earth River crossing in North Mankato and Mankato.

Middle segment

Belgrade Ave

Many people supported the pedestrian improvements concept at Belgrade Ave/Veterans Memorial Bridge compared to the roundabout concept. People who did not support the roundabout concept said the existing traffic lights on Belgrade Ave already work well, roundabouts can be perceived by pedestrians as dangerous to cross, and construction is too costly for the roundabout.

Riverfront Dr

While few people provided feedback on the Riverfront Dr concepts, there was some support for the signalized corridor concept and the right turn lane concept.

Most people who commented on the Riverfront Dr concepts opposed the design concept east of Hwy 169 because of the property acquisition impacts and cost for construction.

Other

Several said that there are safety issues for cars merging at Lookout Dr and Sherman St before getting on southbound Hwy 169 at the North Star Bridge. People said that there is no clear indication of which road has right-of-way and which should yield, so people slam on their brakes or speed up when two cars approach the merge at the same time. Some people suggested signage could help with the confusions and clarify which road takes right-of-way.

South segment

The south segment is between Blue Earth River crossing and Hwy 60 in Mankato and South Bend Township.

Pedestrian and bicyclist connections

Many people supported the proposed pedestrian and bicyclist improvements crossing Hwy 169 in the south segment. Most people preferred the proposed Hawley St pedestrian bridge compared to the Blue Earth River Bridge pedestrian underpass. People said that there is an existing underpass and stairway at the Blue Earth River Bridge, so a new pedestrian connection near Hawley St would be better.

Hawley St and County Rd 33

Although few people provided feedback on the Hawley St and County Rd 33 Green T concepts, more people supported the County Rd 33 Green T than the Hawley St Green T design. People said it is difficult for cars at Hawley St to see westbound Hwy 169 traffic because of the curve after the Blue Earth River crossing, and there were concerns that this could cause issues with cars from Hawley St merging onto westbound Hwy 169.

In addition, many people expressed support for the proposed acceleration lane from Hawley St to eastbound Hwy 169. The proposed lane would be longer than the existing acceleration lane, providing more time for Hawley St traffic to get up to speed with cars on Hwy 169.

Hwy 68 to County Rd 90

Many people said that they like the proposed High T design at the Hwy 68/Hwy 169 intersection. People said the design would be safer and reduce the risk of severe collisions because drivers going to and from Hwy 68 from westbound Hwy 169 would not cross in front of eastbound Hwy 169 traffic.

However, some businesses expressed concerns that the proposed RCUT at County Rd 120 will not address the acceleration challenges for commercial trucks turning onto Hwy 169 from County Rd 120. They suggested adding acceleration lanes in the proposed design.

County Rd 90 to Hwy 60

There was some support for the County Rd 69 RCUT concept; however, few people provided feedback on the proposed concepts between County Rd 90 and Hwy 60. There were some comments from businesses about ensuring turns are wide enough for a truck and trailer to make the movement.

South segment

Figure 2: Phase 2 engagement comments

Some of the following comments are paraphrased because they were provided verbally. The location indicates which area of the corridor the comment addresses. Some people provided comments on more than one location or on the entire corridor. Comments are organized by their primary location addressed or it is noted if location is not applicable.

Source	Location	Comment
Email	Belgrade Ave	I have been involved and all that happens is you're asking for my opinion on what changes to be made. Why am I hearing comments that talk about a roundabout at the bridge and not closing Webster when it sounds like something has been shown to some of the people that would arouse such comments? Should I be submitting things like a roundabout in LeHillier or an overpass for Why 68 to cross the hay above ground so collisions would be eliminated at ground level? If you have some ideas of what could be done, why are you not telling us what they are so I can base my thoughts on what you think is possible and might have in the works. My thoughts for a stop signal in LeHillier have long been debunked because it would be at the base of a slope and would make many people have added wait time. They put County 90 through the homestead on my farm and if you think that I have not gotten involved in roads and what's happening, you are wrong. When it was decided that drainage along the County 90 would only be a 10 year-24 hour storm event, there is no way that a 24 inch culvert is going to carry all of the water that comes out of the long ravine that the road destroyed. What I want to see is the ideas that city people seem to be talking about at your meetings. Sharon
Focus Group	Hwy 68/CR 120	Proposed RCUT at CR 120 wouldn't really help with the issue at the intersection. Issue is that employees, customers, and deliveries need an acceleration lane on eastbound Hwy 169 heading toward Mankato. Support the High T at Hwy 68. Would it be possible to do that at CR 120?
Focus Group	Hwy 68/CR 120	Most employees live in Madelia and Lake Crystal. Crossing speeding westbound Hwy 169 traffic to CR 120 is challenging and unsafe.
Focus Group	Hawley St/CR 33	Left turns from Hawley St onto Hwy 169 are unsafe because it's a blind curve. Westbound Hwy 169 traffic can't see cars at Hawley St. The Green T at CR 33 would be safer than at Hawley St, but what would be best is a High T at Hawley St.
Focus Group	CR 69	Make sure the RCUT at CR 69 is wide enough for a tractor trailer to make the turns
Focus Group	CR 69	Would like design to include flashing yellow signs to signal to drivers that trucks are getting onto Hwy 169 at intersections. Don't like traffic circles, but J-turns seem to work.
Focus Group	N River Ln/Webster Ave	Concerned that semis won't be able to easily make a left turn at the N River Dr/Nr River Ln intersection. Was a roundabout at Lind St considered? Would the diverging diamond interchange keep the Lind St intersection open? McDonalds is a convenience destination. Closing Lind St will hurt the business.
Focus Group	Lake St	Do any of the Hwy 14 interchange options close off access at Lake St?
Focus Group	N River Ln/Webster Ave	Prefer the roundabout concept at River Ln and Webster Ave. Traffic lights are bad for through traffic.
Focus Group	Hwy 14	Prefer to keep the Hwy 14 interchange as is
Focus Group	Range St	Keep Range St open to traffic because it'll be easier for drivers to see how to access businesses
Focus Group	N River Ln/Webster Ave	Pedestrians are mostly likely to cross Hwy 169 at Lind St. Prefer the crossing at Lind option
Focus Group	N River Ln/Webster Ave	It's really hard for truck traffic to make the "s" turn on N River Dr near the Harley Davidson.
Focus Group	N River Ln/Webster Ave	Make sure the acceleration lane from N River Ln to northbound Hwy 169 is long enough for trucks to get up to speed with traffic.
Focus Group	N River Ln/Webster Ave	Add signage for businesses losing direct access from Lind St, like McDonalds and Kwik Trip.

Source	Location	Comment
Comment form	Hawley St/CR 33	I live by the Clark station. When my husband and I try to get on 169 it is hard because we have to wait for the cars to get by before we can get on. This does cause a back up on this. There is also 4 way intersection and I've almost had an accident there several times because the ones coming from the Big Gain area and they have a stop sign. I need to turn to the far left. I turn on my signal and the one at the stop sign pulls through and I get cut off.
Phone call	Hwy 68/CR 120	• Benco is very concerned about existing safety concerns at the CR 120 and Hwy 68 intersections. They have multiple trucks entering/exiting Hwy 169 daily and their business requires quick response to customers. • They witness many close calls daily as traffic entering Hwy 169 misjudges the gap available and oncoming traffic has to quickly merge and/or quickly brake to accommodate. He said this is exacerbated by Benco's trucks (some with trailers pulling heavy equipment) which are slow moving and take time to accelerate. • Benco would like to see acceleration lanes in both directions at CR 120 in the short-term and is willing to discuss providing land to accommodate this (at least on their side of the highway where they own multiple parcels and the farm field adjacent to their building). • Benco is not supportive of an RCUT since it doesn't address their primary concern of space to safely accelerate. • Tim said Benco fought hard several years ago to keep the CR 120 intersection open as there was apparently talk of a closure at that time. Benco would oppose any type of closure at this intersection. Note: we do not have a concept that shows a full closure. This was something Tim brought up. • I talked to Tim about the potential to reroute their trucks/employees to the Hwy 68 intersection if it were improved to something like the High-T intersection which would greatly improve safety and operations. He likes the High-T design but is concerned about additional travel time and railroad delays impacting their response time to customers. • Tim stated there are issues at the existing Hwy 68 intersection since people do not use the median/acceleration lane properly. He said many yield in the median when they really should keep going since they have a dedicated northbound acceleration lane. This causes confusion with drivers also wanting to cross the southbound 169 lanes and enter the median and then find out the vehicle in front of them stopped and is taking up the space in the median.
Open house	Riverfront Dr	Taking access off of Riverfront Drive may by problematic. Where will businesses have their second access? Burger King might not like it.
Open house	Riverfront Dr	What is the staking problem at the Riverview Drive with the signalized concept? Stoltzmann Rd experiences long delays.
Open house	Riverfront Dr	With new through lane at Riverfront Drive, home much foundation impact for bridge? Bridge deck width will be a challenge.
Open house	Riverfront Dr	For Riverfront Dr fly over concept, access to the title company will be problematic.
Open house	Riverfront Dr	Will access at small street serving the Leatherworks be maintained?
Open house	Hawley St/CR 33	Will the Amos Owen RCUT, need to adjust road elevation? People are not slowing down going up the hill to make the U-Turn
Open house	Hawley St/CR 33	Is it pretty sure that Hwy 169 will have extra lane over the Blue Earth River? It's a great idea. A lot of vehicles don't follow the yield sign.
Open house	N River Ln/Webster Ave	Has there been Pedestrian crashes?
Open house	N River Ln/Webster Ave	Considering the destinations at Lind and Webster, would we consider more than one Grade separated crossing?
Open house	N River Ln/Webster Ave	Do the roundabouts have more longevity that the traffic lights concept?
Open house	N River Ln/Webster Ave	What is the level of service off Webster and Lind for roundabouts?

Source	Location	Comment
Open house	N River Ln/Webster Ave	What is the cost to society for the crashes at Lind and Webster?
Open house	Range St	To reduce conflicts at Range and Webster, clos the north side entrance to Speedway and move driveway entrance further south so it's not impeding on cars piling up at Range/Webster.
Open house	N River Ln/Webster Ave	How would the ramps work with the Webster interchange option?
Open house	N River Ln/Webster Ave	There are lots of places stopping traffic on Hwy 169 in the existing layout. Want to reduce the number of traffic signals when the road is reconstructed.
Open house	Hwy 14	Is there a difference in crash rate for diverging diamond interchange compared to roundabout or traffic lights option?
Open house	N River Ln/Webster Ave	By pedestrian grade separation, does that mean a pedestrian bridge or underpass?
Open house	N River Ln/Webster Ave	A future trail on Hwy 14 is already planned. Prefer the other concepts.
Open house	N River Ln/Webster Ave	Kwik Trip prefers the traffic signals concept or roundabouts concept.
Comment form	N River Ln/Webster Ave	Why can't you lower 169 10 to 13 feet and put an overpass above at both intersections 6 to 10 feet above existing grade that will give you a minimum of 16 feet clearance, also you would not need to detour traffic just lane shifts throughout the entire project. The Lind and Webster streets wouldn't need signal lights either. Construct just like the Veterans Memorial Bridge. If space is limited construct retaining walls to bring exit and on ramps closer to 169.
Comment form	Hwy 68/CR 120	We definitely do NOT need another round about!!. By the time vehicles leave Lehillier they are going 80 MPH when they reach Hwy. 68. It is a death trap.
Email	N River Ln/Webster Ave	What are the alternatives to Round Abouts on 169? This honestly seems like the absolute worst option, how does it rank so high? Is it due to federal funding? What is the best way to keep 169 free of round abouts and get it to being a high speed exit for Mankato? We just bought a house in Mankato and I really don't want to have to move if this plan goes through in the next couple of years.
Songs on the Lawn	N River Ln/Webster Ave	Prefer roundabouts at Webster vs. signals
Songs on the Lawn	N River Ln/Webster Ave	No J turn, no R cut. Both are dangerous
Songs on the Lawn	N River Ln/Webster Ave	Safety problems for pedestrians crossing 169 at Webster. Put in a bridge?
Songs on the Lawn	Belgrade Ave	Pedestrian safety and comfort nee d to be improved along Belgrade to the bridge
Songs on the Lawn	Hwy 14	Best option 1. 14/169: complete cloverleaf. 2. Concept 1B 3. Agree with Belgrade/Vets Bridge roundabout 4. Agree with Riverfront Dr East of 169 concept
Songs on the Lawn	Hawley St/CR 33	Needs to be improved bike trail connectivity from Le Hillier to Williams Nature Center
Songs on the Lawn	N River Ln/Webster Ave	I am concerned about the safety of roundabouts
Songs on the Lawn	Hawley St/CR 33	Drivers do not slow down in Southern Segment to match the speed limit decrease

Source	Location	Comment
Songs on the Lawn	Belgrade Ave	Right now there is concern for bike and vehicle conflicts on Vets Memorial Bridge
Songs on the Lawn	N River Ln/Webster Ave	Prefer roundabout at Webster. I drive north on Webster and cross 169 every day. I cannot tell if opposing traffic is going to go straight or turn left. A roundabout would fix this.
Songs on the Lawn	N River Ln/Webster Ave	Go with the two roundabouts
Songs on the Lawn	Hwy 14	After seeing Hwy 14 interchange concept 2C, I believe this would be a great benefit to drivers' safety
Songs on the Lawn	N River Ln/Webster Ave	J turns are the WORST idea - EVER!
Songs on the Lawn	Belgrade Ave	The stoplights at Belgrade are too fast for pedestrians to cross with enough time.
Songs on the Lawn	Hawley St/CR 33	In the Southern Segment, the pedestrian crossing by the gas station is dangerous for pedestrians.
Email	Belgrade Ave	I was wondering if replacement of the barrier wall between the Veterans Bridge and the North Star Bridge. was part of this project or on MnDOT's schedule. The wooden wall has deteriorated and there are larger gaps between the boards. I believe the noise from the highway has increased in recent years, but of course that's subjective. I'm not sure if MnDOT has checked the sound coming through the wall, or has any plans for replacing it. If there is someone at MnDOT you can point me to, or if you know anything about that issue, I'd appreciate it.
North Mankato Farmers Market	N River Ln/Webster Ave	R-CUT not supported. Opt to move past this type of intersection for more accessible business. [in Northern Segment]
North Mankato Farmers Market	N River Ln/Webster Ave	The traffic lights at Webster don't read my motorcycle. I have to pull into the gas station parking lot and wait for a car to come to trip the green light.
North Mankato Farmers Market	N River Ln/Webster Ave	[in Northern Segment] I support concept 1B. No on 1C.
North Mankato Farmers Market	Hwy 14	The diverging diamond makes sense.
North Mankato Farmers Market	N River Ln/Webster Ave	No to RCUT at Webster
North Mankato Farmers Market	N River Ln/Webster Ave	Recommend a dedicated left turn light at Webster.
North Mankato Farmers Market	N River Ln/Webster Ave	North: River lane: Roundabout. Hwy 14: Add signal, eliminate S. loop. Middle: Belgrade: Roundabout. Riverfront: Signalized corridor
North Mankato Farmers Market	N River Ln/Webster Ave	Important to balance business access in North Segment
North Mankato Farmers Market	N River Ln/Webster Ave	The Northern Area needs to be redone (invest in new buildings)
North Mankato Farmers Market	N River Ln/Webster Ave	People will not like RCUTS

Source	Location	Comment
North Mankato Farmers Market	N River Ln/Webster Ave	Prefer roundabouts to signals in Northern area.
North Mankato Farmers Market	Hawley St/CR 33	Flooding on 169 in Southern Segment during rain. Big problem.
North Mankato Farmers Market	Hawley St/CR 33	Driving north on Hawley to turn on to 169 is very dangerous, you can't see oncoming vehicles. Even if they let the grass grow a little bit, can't see over the grass. Also bad with snow.
North Mankato Farmers Market	N River Ln/Webster Ave	Better education to people on how to use roundabouts
North Mankato Farmers Market	N River Ln/Webster Ave	Roundabouts work well in Europe and should work here too.
North Mankato Farmers Market	N River Ln/Webster Ave	No more roundabouts. They are dangerous to our roads.
North Mankato Farmers Market	N River Ln/Webster Ave	Any roundabouts on 169 must be accommodating to large commercial truck traffic.
Email	Hwy 14	I viewed the presentation and I think for the Hwy 14 interchange, eliminating the existing loop is definitely the wrong option. The main goals of 169 corridor, from memory, is to improve safety and streamline traffic flow from within the Twin Cities through Mankato. So eliminating the traffic signals and reducing the number of vehicles that have to cross the opposing lane of traffic to get onto or off of hwy 14 is improving traffic flow and positioning the interchange for the future. By going backwards and making more traffic cross 169 is making the situation worse. Additionally, when crashes and deaths increase, this interchange will be at the back of the line to correct the problem created by saving some money. The double-diamond intersection is also very poor for this part of the state. Drivers in Mankato and passing through struggle with traffic circles and even, especially, center turn lanes (they turn from the traffic lanes now - very often). Plus this will also result in delays because of the traffic signals and the confusion drivers will have, and some will even stop with no reason because of the confusion. A full cloverleaf is the best option for the intersection of the two major highways in Southern Minnesota. If limited funds are available, constructing the northeast part of the cloverleaf will reduce the amount of traffic crossing 169 by a half I'm guessing. But MNDOT has not balked at cost for other counties along 169 in the past. The additional money with aesthetics in St. Peter like fencing, flower pots, Christmas lights and trees were quite indulgent. Extra aesthetics for Bloomington interchanges are also generous. Closing off the Lind Street exit will put the McDonald's largely out of business. I think that MNDOT will need to move that business - which is fair for cutting off access to a vibrant business that relies on easy access. MAPO needs to support that. Kwik Trip also will be impacted and should be compensated or rebuilt. So the idea of not making a full interchange and not moving the McDonald's is unthinkable. If that is the case, nothing should be done and Lind Street should remain open. Traffic circles would be good for the other locations. Access to Monroe should be blocked. Cars coming from North Mankato onto 169 have resulted in a lot of close calls that I witnessed. I know North Mankato wants to keep that and said that this will back up the Bellgrade exit, but there just isn't enough use of Monroe to cause that.

Source	Location	Comment
Comment form	N River Ln/Webster Ave	Roundabouts need semi truck thruput design to be feasible. Ped crossings at the Webster and midpoint intersections will have to be at grade—no one will use overhead or tunnel designs. Adding the ped connection at TH 14 to the bridge, both river trail connections and the north Mankato hill trail will be used and is a good concept adopted when the bridges are updated. The frontage roads concepts are very workable. The Hwy 68 layouts are difficult to justify since the present lane and bridge and trail meet present demands safely at present and likely future traffic volumes. Good concept that should be advanced with the infrastructure legislation making it sooner than current funding anticipates.
Comment form	N River Ln/Webster Ave	i think that the process would be easier if all the areas with a boundary of the west side of the Minnesota river and to the North of Belgrade avenue and to the South of Hwy 14 were part of North Mankato. Can North Mankato and Mankato work together to make that happen? Then we would need just 1 diamond interchange in the "area of Perkins" to get access into both sides of Hwy 169. Easy!!! Get it done!
Comment form	Hawley St/CR 33	Please baffle sound from Sibley to past LeHillier. River now amplifies traffic noise. Industrial plants —Honeymead could be hidden, too
Comment form	N River Ln/Webster Ave	Don't be swayed by commercial interests with the corridor study. "We will go out of business". "You are anti- business". This is THE major North/south route thru the Mankato area. It is meant to move traffic fast, efficient and safely. Economics adapt or die- if current commercial businesses suffer an economic downturn go ahead and re-tool, sell etc.- there are always other or smaller businesses that can take over. Keep only Webster, Belgrade, Lookout, S Riverfront intersections open. Also, address the need of more lanes eastbound from Hawley, by the Gas station. A yield sign is currently ignored by most drivers as they merge onto 169. Either bad planning in the '60's, lack of driver KSA's of lcal drivers or more traffic but after fifty yrs of traveling this route the tire screeching near misses and swerving due to ignoring the yield sign is frightening. Finally- don't forget county road 50, just west of the 60/169 junction. This has seen higher semitruck traffic coming from the north and I have witnessed many near misses and complete stops of 169 vehicles as these big rigs hang over into the Hwy 60 westbound lanes as they wait to turn east in the median. Not sure if the increased usage is due to the improvements on #50 or is a shortcut to 169 south or if truckers are avoiding the 68/169 intersection.
Comment form	Hwy 14	The cloverleaf design is the already well proven best investment for the future of this (or any) growing city. Installing roundabouts on major highways isn't the best choice for a huge number of reasons. I don't know what kind of huge grant money or brag the city is after with all the trail work, but putting some of that money towards this project and doing one thing at a time is a way better approach. Do more by funding one large thing at a time.
Comment form	N River Ln/Webster Ave	If they put in roundabouts for giant corporations like Kwiktrip, they really don't care about the citizens. NO ROUNDABOUTS!!
Comment form	N River Ln/Webster Ave	Do not put roundabouts in. Make it an actual freeway like it is in the cities.
Comment form	N/A	As a part of the next generation please spend the money now so we don't have to spend it when the problems get worse.
Comment form	N River Ln/Webster Ave	The main purpose of the corridor should be to get through traffic through the city with as few stops as possible. Traffic lights should be limited and roundabouts on this highway should not be put in.
Comment form	Hwy 68/CR 120	I don't see any changes for Hwy. 68 intersection where are they on the Map?? Vehicles are going 80 MPH by the time they get to the Hwy. 68 intersection.
Comment form	N River Ln/Webster Ave	More roundabouts? I avoid the roundabouts on highway 22 in Mankato. They are poorly designed and people don't know how to drive through roundabouts correctly. Try turning left to go to HyVee when your traveling south on Hwy 22 in Mankato. Which lane are you supposed to be in? Are the signs correct? Are the pavement markings correct? I don't know so I try to shop elsewhere.
Interactive map	Belgrade Ave	Why is this split here. It seems that once this would have been the spot for future bridge crossing. I don't see it being much use anymore. Consider making more room for the houses nearby.
Interactive map	Belgrade Ave	Roundabout provides little benefit for the substantial cost. A traffic signal adequately addresses bike/ped needs while reasonably balancing delays experienced by drivers.

Source	Location	Comment
Interactive map	Hawley St/CR 33	Can access be reduced, traveler safety improved, and pedestrian crossings be more safely accommodated with an interchange here?
Interactive map	Hawley St/CR 33	Like the idea of providing pedestrian/vehicle grade separation in this area.
Interactive map	N River Ln/Webster Ave	Adding more traffic signals on US 169 is the wrong answer. Construct an interchange (or two) on this busy roadway to balance all competing needs (local access, separation of cars and bikes/peds, and reduced delay for traffic on US 169.
Interactive map	Hwy 14	This is the junction of two of the area's busiest roads. Build the full interchange and don't even think about adding traffic signals.
Interactive map	Hwy 68/CR 120	Like the idea of a "High-Tee" for the intersection with MN 68.
Interactive map	Hawley St/CR 33	There is already a stair way under the bridge here so bicyclists could just go to the new elevated bridge instead of spending extra money here.
Interactive map	Hwy 14	If a diverging diamond is considered a sigle-point interchange should also be considered to limit the number of lights at this interchange.
Interactive map	Belgrade Ave	Roundabouts are too difficult to cross as a pedestrian and immpossible to cross at high traffic times.
Interactive map	Hwy 68/CR 120	Option 2C would take too much work to change the trail around the new roads.
Interactive map	N River Ln/Webster Ave	Just spend the money to make it nice and fast. NO ROUNDABOUTS. Have an exit and a frontage road if people want to get to the businesses. It can be combined with the overpass for bikers/peds.
Interactive map	N/A	When is the city going to address the seemingly unregulated LED signs everyone has up? They're all animated (don't stay on a static image for 10 seconds) and don't follow LED billboard rules for how bright they're allowed to be vs ambient lighting.
Interactive map	N River Ln/Webster Ave	This is the answer, making it a proper highway with NO ROUNDABOUTS. It's bad enough St. Peter slows you down on the way to the cities, Mankato doesn't need to be a second problem area.
Interactive map	Belgrade Ave	These signals never seem to delay me in getting home. A roundabout is an ugly eyesore that is unnecessary. Is it being considered because federal dollars subsidize it or what? Keep it how it is.
Interactive map	N River Ln/Webster Ave	Do these light currently have sensors? When I'm there at 1:15 in the morning, it doesn't seem like they do. They're poorly constructed. You could fix that, OR just get rid of them and have a frontage road. NO ROUNDABOUTS
Interactive map	CR 69	Turning southbound to continue on 169 towards Vernon Center is not safe, nor is 169 northbound to 60 westbound. An interchange is needed.
Interactive map	N River Ln/Webster Ave	Roundabouts and tight turns should be avoided on this section of road due to the high levels of truck traffic turning off here.
Interactive map	N/A	They've already started to ruin this area with roundabouts. They'll take 50 years to get rid of now.
Interactive map	N River Ln/Webster Ave	It appears as though the pedestrian crossing for this roundabout go under the road and then come back up. The crossings at grade are outside of the roundabout, presumably after vehicles have been forced to reduce speed by the roundabout.
Interactive map	Hwy 14	2D - I like that one the best.
Interactive map	N River Ln/Webster Ave	Roundabouts keep traffic flowing and provide easier access to businesses on both sides of the highway. They also keep traffic going slower through this busy area. I do agree with another comment that a pedestrian bridge would be much safer for pedestrian traffic.
Interactive map	Belgrade Ave	The pedestrian crossing for the roundabout appear to go under the roundabout, like a pedestrian tunnel, and then along the bridge like it is now. If that's the case, the roundabout option seems like a great solution to reducing speed coming into town while also protecting pedestrian traffic across the bridge. The crossings at grade are after the roundabout, presumably after vehicles have been forced to reduce speed.
Interactive map	N River Ln/Webster Ave	DO NOT use roundabouts and say that pedestrians can get across easily. The roundabouts on 22 show the problem clearly with traffic already too interested in crossing the roundabout they don't stop for pedestrians. This causes pedestrians to either not use the intersection or avoid it entirely. Which in the future would make it more costly when the city is forced to put in elevated crosswalks.

Source	Location	Comment
Interactive map	Sherman St/Lookout Dr	There is awkward merging from Lookout Dr/outbound Sherman Ave. onto 169. No clear right of way. Potential for accidents.
Interactive map	N/A	Talk to city leaders. They're currently refusing any decrease in access, even to make roads better.
Interactive map	N River Ln/Webster Ave	Multilane roundabouts don't make sense on this corridor. If there's an overwhelming amount of traffic turning onto and off a road, okay they make sense. That's not the case on this portion of US 169. Construct interchanges.
Interactive map	N River Ln/Webster Ave	Add an interchange exit and bridge at Webster. This is too busy of an area for a roundabout. Most of the businesses in this area are destination businesses--cars and trucks would benefit from the better access of an exit.
Interactive map	Hwy 14	Definitely!! Keep the traffic moving. I'm very surprised a traffic signal is even being considered here. Build a cloverleaf or flyover.
Interactive map	Hwy 14	Your cost analysis is flawed. Your lower cost alternatives (roundabout/more stop lights) don't include the true cost of needing to subsequently build a 169 bypass around Mankato. If you slowdown traffic more with lights, a bypass is what we'll need to build in 5-10 years for $100M+.
Interactive map	Hwy 14	169 is our region's 'Interstate' connection to the South and West. It provides truck and commerce connections to I-90, I-29, and I-80 (Sioux Falls, Sioux City, Omaha and points south and West). Increased mobility (i.e. no stoplights) provides better opportunities for truckers and cars to connect to interstates. This will bring our community more hotels, restaurants and businesses.
Interactive map	N River Ln/Webster Ave	I agree with getting rid of traffic lights at both intersections and adding at least one overpass style intersection mid point of Lind and Webster as long as there is frontage roads. This would be safer for foot traffic and improve traffic delays
Interactive map	N River Ln/Webster Ave	Local and long distance travelers on 169 don't want more stoplights. We are so close to having a multistate 4 lane without stops. We need to get these interchanges built right or we'll be stuck with stoplights in town for another 40 years.
Interactive map	Hwy 14	Adding traffic lights to this intersection would be a bad idea keep it a full intersection.
Interactive map	N River Ln/Webster Ave	1D
Interactive map	N River Ln/Webster Ave	If the Mankato city leaders won't listen because businesses like Kwiktrip and bullying them into "access," perhaps we need to bring bigger guns in so this corridor can benefit the state as a whole? Maybe we should be reaching out to our state representatives for help.
Interactive map	Hwy 14	To accompany the full cloverleaf interchange at US14 and US169, consider building a half-interchange (NB on-ramp, SB off-ramp) to access the frontage road businesses north of US14.
Interactive map	N/A	The two groups that love to place roundabouts at every possible intersection...engineering consultants and concrete companies! ;)
Interactive map	N River Ln/Webster Ave	I can't believe that after 40+ years of waiting for this section of highway 169 to be improved that more stoplights and RCUT intersections are the consultants preferred concepts. The State has spent $100's of millions expanding 169/60 to 4 lane from the Twin cities to the Iowa border. Now this is pushing us back in time to stoplights. There's very few lights left on this entire corridor from the metro to Sioux City and this study needs to view 169 from the multi state connection perspective.
Interactive map	N River Ln/Webster Ave	As a driver I find roundabouts/traffic circles easy and smooth to use, but as a pedestrian or cyclist I find they are too tricky to cross. Maybe I'm not used to them as a pedestrian, but I don't see it being convenient on 169.
Interactive map	Hwy 14	Please consider building out a full interchange here to improve traffic safety and reduce congestion. If necessary to reduce delays with a potential Webster Avenue interchange, consider adding auxiliary lanes to accommodate the merge/diverge motions. Then, the Webster Avenue interchange could serve as the business access for both sides of 169 while increasing safety and mobility. A good example of this is in Belle Plaine.
Interactive map	Hwy 14	I trust the evaluation scores given, so I would agree, 2D is the best option provided.
Interactive map	Riverfront Dr	Is that last option really the only thing the city could come up with. It seems silly and not feasible.
Interactive map	N River Ln/Webster Ave	Someone needs to actually speak to someone on the planning board in North Mankato because whoever said this shouldn't be a multi-level crossing deserves to be fired. The one at Belgrade shows just how effective a multi-layer interchange is and how it would help future

Source	Location	Comment
		proof. It would also make it cheaper in the future if Mankato wanted to connect Madison Ave to 169.
Interactive map	N River Ln/Webster Ave	Roundabouts to help slow down traffic is a good thing. Too many dangerous accidents on this stretch of road over the years. Thank you
Interactive map	Belgrade Ave	Traffic signals work great at this intersection. Never more than a short delay. There is no need for a wasteful roundabout.
Interactive map	N River Ln/Webster Ave	This [Lind St] is a perfect spot for a pedestrian/bike tunnel or bridge. It connects the North Mankato city trail/bike lanes to the Minnesota River trail in a safe manner. The lights do not pick up bikers trying to cross on the road and people dont cross 169 because its feels dangerous.
Interactive map	Belgrade Ave	Please don't put a roundabout here The traffic signals seem to work fine!
Interactive map	Sherman St/Lookout Dr	I agree that Sherman St and Lookout Dr seem like they don't have enough length here to merge comfortably.
Interactive map	Lake St	It would be Great if traffic going to northbound 169 had a dedicated on-ramp from the frontage road or the ramp could start in front of the business. Additionally at this intersection and at the intersection between the gas station and Happy chef it would be nice if these locations had acceleration lanes for going south on 169. Another thought on the two intersections; make one of them a designated southbound route with an acceleration lane and then eliminate the other southbound access.
Interactive map	N River Ln/Webster Ave	Many businesses in this area would actually benefit from a full interchange. Myself and many others avoid traveling through this area because of the stoplights and congestion.
Interactive map	Hawley St/CR 33	The on-ramp to northbound 169 is a joke. Even if it wasn't full of potholes it still provides almost no adequate time to accelerate.
Interactive map	Hwy 68/CR 120	It would be great if this intersection could be designed to be "lower pressure". As it is, it seems like traffic turning east from 68 is forced to turn before having time to evaluation the eastbound traffic. It would be great if there was a stop sign in the middle or more defined lanes so that traffic would not try to cut around you if they think you're taking too much time.
Interactive map	Belgrade Ave	Please don't waste your money on this intersection.
Interactive map	Hwy 68/CR 120	Seems safe as is
Interactive map	Sherman St/Lookout Dr	It would be nice if a yield sign could be added to traffic from Sherman Street. A simple easy solution to this conundrum.
Interactive map	Lake St	It would be great if traffic going to northbound 169 had a dedicated on-ramp from the frontage road, Additionally at this intersection and at the intersection between the gas station and Happy chef it would be nice if these locations had acceleration lanes for going south on 169. Another thought on the above two locations is to make one of the intersection a designated southbound route, with an acceleration lane, and then eliminate the other southbound access.
Interactive map	N River Ln/Webster Ave	Not sure what cost implications would be but making this a tunnel under the highway rather than over would be something to consider.
Interactive map	N River Ln/Webster Ave	Is there any way to eliminate both intersections, and do one major interchange somewhere along this stretch that accesses frontage roads on both sides of 169?!
Interactive map	Belgrade Ave	We routinely take this route for the art walk via walking and an older gentleman on scooter. Additionally we take this route when we ride our bikes with our child, neither instance provides us with any fear or discontent when crossing the intersection on either side.
Interactive map	Riverfront Dr	Option two looks quite desirable. Could you maybe add a blinking light above a yield sign for traffic going from riverfront drive West to northbound 169.
Interactive map	Riverfront Dr	Is there any chance we can do a similar interchange to what they did near Shakopee at MN 41 and US169? It's a crossover under the bridge. SEE THE PICTURE

Source	Location	Comment
Interactive map	Hawley St/CR 33	Extending the acceleration lane east all the way over the bridge is a great idea to reduce lane conflicts because so many vehicles that turn east from Hawley street try to merge too quickly.
Interactive map	Belgrade Ave	This area is already really nice, I don't get why they want to change it. I've never experienced delays, nor have I had a hard time crossing the bridge on my bike. Seems like a complete waste of money.
Interactive map	N River Ln/Webster Ave	For years I have often wondered why there wasn't a direct connection between 169 and Madison Avenue. It would seem an no brainer to alleviate traffic concerns from 169 and Belgrade, and the 3rd Ave/Riverfront Dr. intersection; you could run a road tied into a Madison Avenue bridge/road (behind the Pizza Hut, etc.). I realize bridge projects aren't cheap, but this would improve the viability, visibility and business access (from Highway 169) of Riverfront, Third Avenue and Madison Avenue.
Interactive map	Belgrade Ave	They are normal crosswalks just not drawn in, so no a roundabout would be terrible. The city would never spend that much money to get pedestrians around the roundabout
Interactive map	Hwy 14	Please consider completing the full interchange here. This is the intersection of two major interregional 4 lane highways. Adding stoplights is a major impediment to mobility, safety and regional commerce.
Interactive map	N River Ln/Webster Ave	I always avoid round abouts when biking/walking. Makes it impossible. They should just have an overpass with exits and add in a bike/walking lane to that. Maybe they should pay attention to what the cities have, rather than what the federal government will give them money for.
Interactive map	N River Ln/Webster Ave	Agreed. I think full frontage roads for the businesses off of 169 is the best answer

Attachment F – Implementation Plan

Highway 169 Corridor Study Locally Recommended Vision

MAPO
MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION

BOLTON & MENK

Northern Subarea Implementation Plan

Short-Term 2021-2025 Projects

2022 Construction

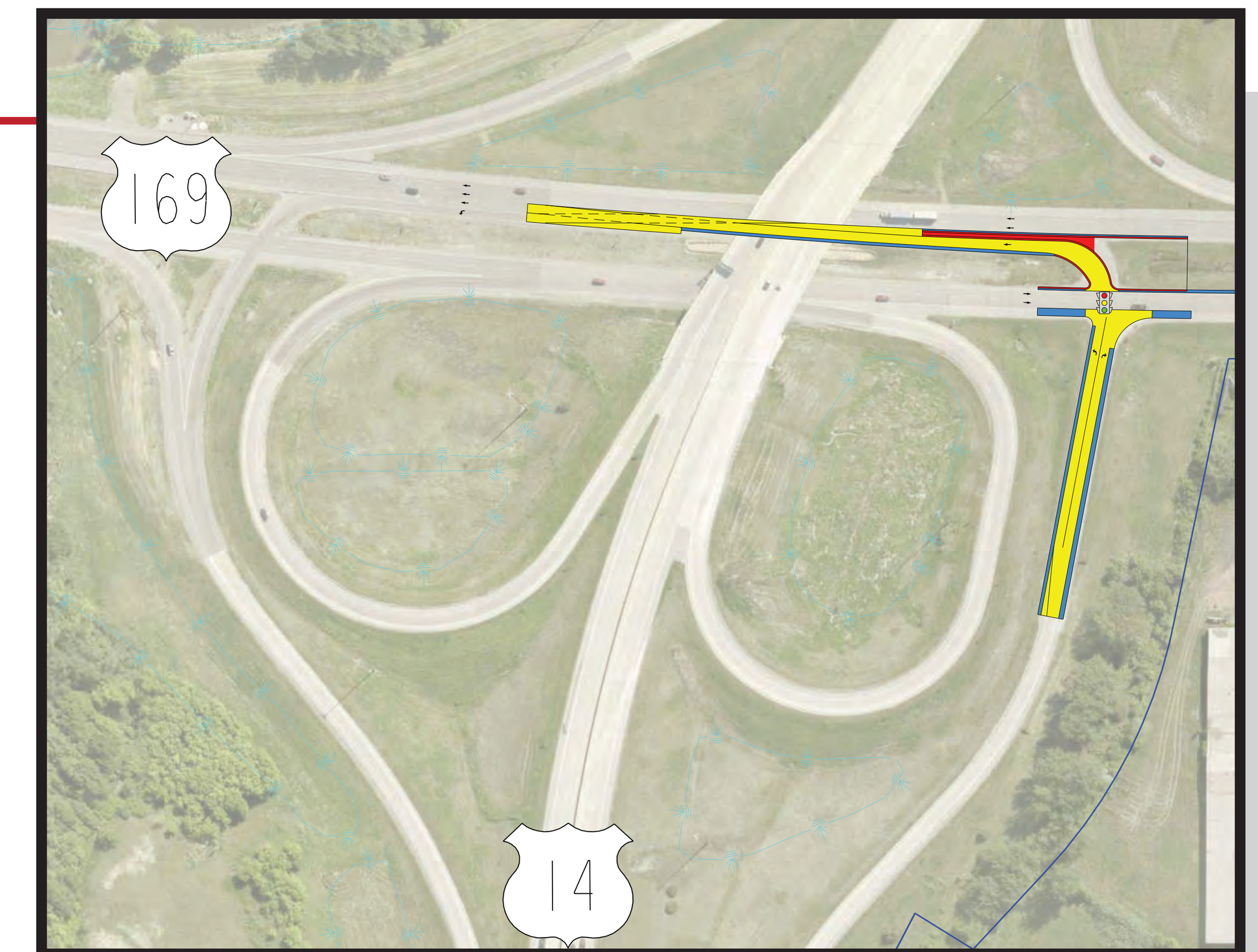
N1 **Eastbound Ramp Signal**

Problem: It is difficult to take a left turn and back-ups are projected to extend onto TH 14 by 2040.

Solution: A standalone traditional signal system installation project at the eastbound Highway 14 exit ramp intersection with Highway 169.

Cost = $500,000 (161.74 Benefit Cost Ratio)

MnDOT led.



Mid-Term 2026-2030 Projects

2027 Construction

Aligns with MnDOT planned investments for 2027

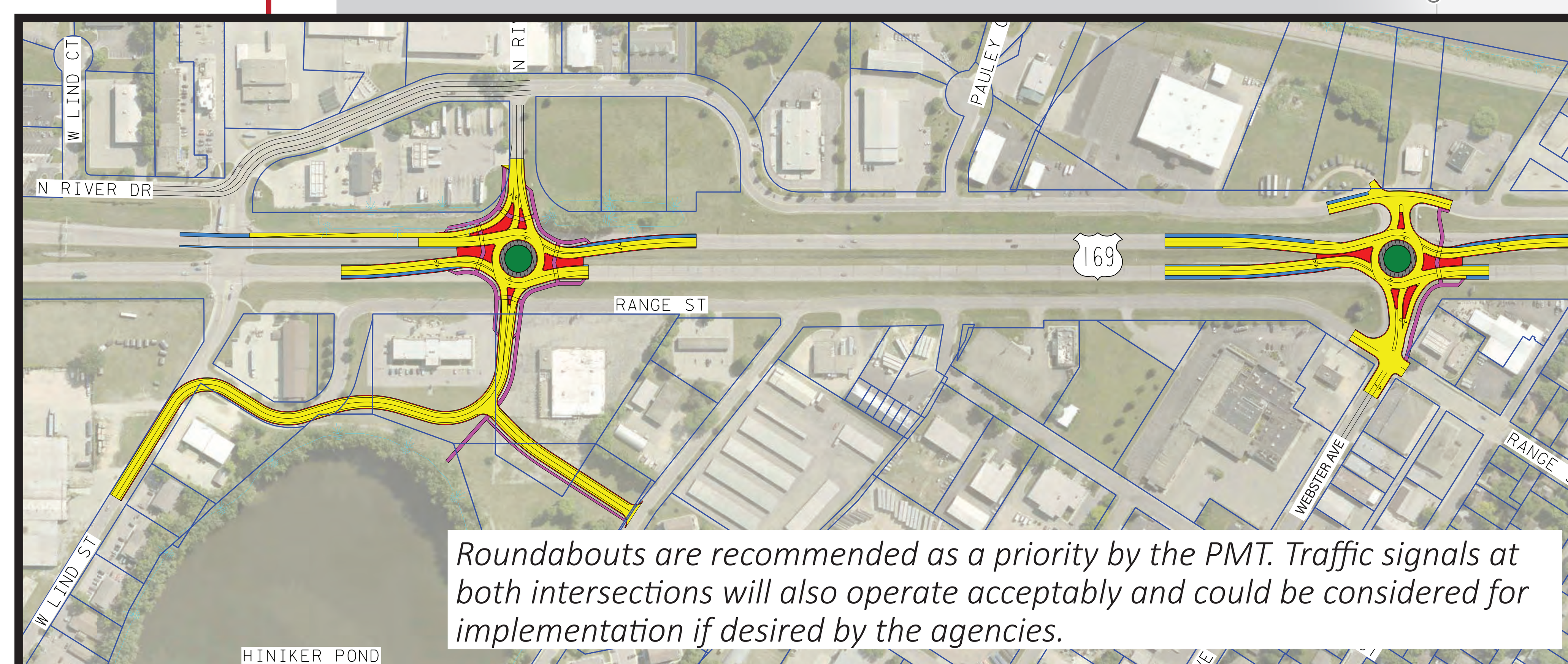
N2 **North River Lane and Webster Avenue Roundabouts or Signals**

Problem: The existing Lind St intersection is closely spaced to the eastbound TH 14 on ramp and is experiencing high crash issues. Both Lind St and Webster Ave experience failing movements and backups blocking business driveways and other turning movements.

Solution: Closure of the Lind Street intersection with a new full access intersection at North River Lane and reconstruction of the Webster Avenue intersection to either a roundabout or leave as signal control. Either option includes restriping on Webster Avenue. Lind Street closure should not occur before the new North River Lane intersection is built. Proposed modifications will require a new local connection on the east side of Hiniker Pond from Lind Street to Butterworth Street and connecting to the North River Lane intersection.

Cost = $4.7-9.3M (2.69 Roundabout and-2.64 Signal Benefit Cost Ratio) + $575,000 for Webster Avenue restriping.

MnDOT led with cost participation from the Cities of Mankato and North Mankato.



Roundabouts are recommended as a priority by the PMT. Traffic signals at both intersections will also operate acceptably and could be considered for implementation if desired by the agencies.

2030 Construction

N3 **Grade Separated Pedestrian Crossing(s) of Highway 169**

Problem: The the surrounding commercial destinations, trails and parks, and residential areas create high pedestrian crossing demand. Also, there were four crashes involving a pedestrian or bicyclist from 2010-2019.

Solution: Grade separated pedestrian crossing near the Lind Street intersection or utilizing the existing Highway 14 bridge if possible. A feasibility study will be required to determine overpass or underpass for the pedestrian grade separation. The video animation included a pedestrian overpass for illustration purposes.

Cost = $5.9M

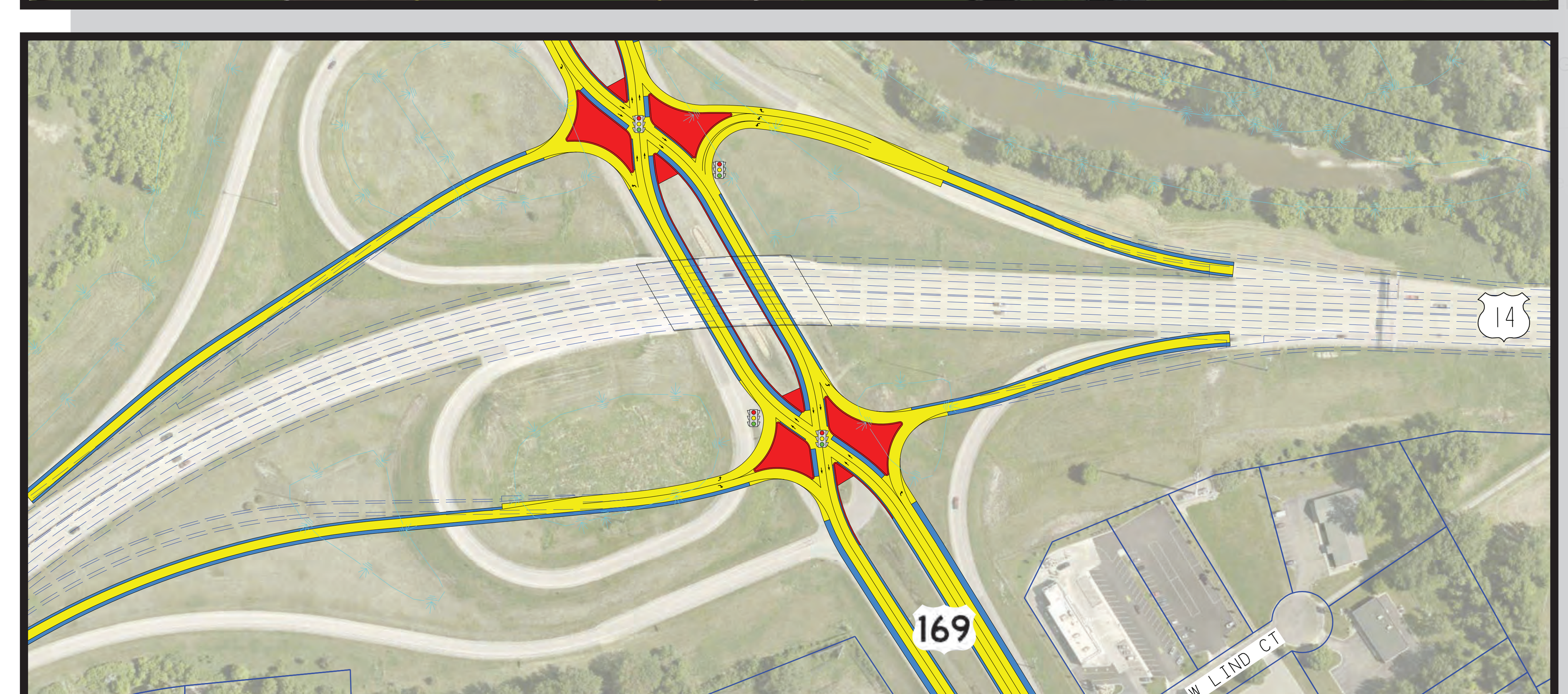
MnDOT led with local agency cost participation based on MnDOT's Cost Participation Policy.

Long-Term 2031+ Development & Safety Driven Projects

N4 *Highway 14/169 Diverging Diamond Interchange ($9M*).*
Reconstruction of the existing partial cloverleaf interchange into a diverging diamond with signalized ramp intersections.

N5 *Grade Separated Pedestrian Crossing ($5M*)*
Agency feedback recognized a grade separated crossing could also be beneficial at Webster Avenue if pedestrian movements were not adequately accommodated on the Veteran's Memorial Bridge and a future Lind Street area pedestrian grade separation.

*2021 dollars



Northern Subarea

The northern subarea runs from the Veterans Memorial Bridge to Lake Street.

Note: All drawings are conceptual and will require further design and public input to confirm specific details.

Highway 169 Corridor Study Locally Recommended Vision

MAPO
MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

BOLTON & MENK

Middle Subarea Implementation Plan

All five concepts, shown were recommended to be carried forward for further consideration in the future. MnDOT and the cities of Mankato and North Mankato will use these concepts as a starting point to engage in further analysis and public input to identify a preferred alternative with future programmed projects. At the time of this implementation plan, MnDOT was actively working with both cities to scope improvements to the Veterans Memorial Bridge, including pedestrian improvements and potential ramp intersection roundabouts.

There were several variables at play during the Highway 169 Corridor Study that may change the results of the analysis and the level of investment needed at this location. These variables included impacts on traffic volumes and patterns due to COVID, shifts in Mankato West High School start times, and uncertainty in the future of the High School in its current location.

Concepts for Future Consideration

M1 **Veterans Memorial Bridge & Belgrade Avenue Improvements**

Problem: There is high pedestrian demand to cross Highway 169 here and the pedestrian environment is unwelcoming and poses safety concerns with long crossing distances at ramp intersections and several interactions with turning vehicles. There have also been complaints regarding high traffic speeds across the bridge.

Solution: A low-cost potential interim solution, and a higher cost long term solution were found to both provide improvements for pedestrian crossings. The higher cost roundabout ramp intersection improvement would also reduce traffic speeds and improve flow onto Belgrade Avenue and the potentially reduced roadway section on the west side of Highway 169.

MnDOT led with cost participation from the Cities of Mankato and North Mankato.

M2 **Riverfront Drive Southbound Exit Ramp Access Improvements**

Problem: The left turns from southbound Highway 169 exit ramp to eastbound Riverfront Drive are heavy during peak hours and causing backups on the ramp towards Highway 169. The left turn demand is caused by the close proximity of the High School, YMCA, and commercial destinations.

Solution: Two solutions were discussed. The Riverfront Drive Turn Lane Improvements option adds a third left turn lane from the southbound Highway 169 ramp and a left turn receiving lane onto eastbound Riverfront Drive will allow more vehicles to move through a traffic signal phase and sort traffic out based on destinations. The Riverfront Drive East of Highway 169 option would have southbound Highway 169 exit along the east side of the highway and allow the heavy eastbound movement onto Riverfront Drive to take a free right as opposed to a left turn.

City of Mankato led with cost participation from MnDOT.

M3 **Riverfront Drive Pedestrian Improvements**

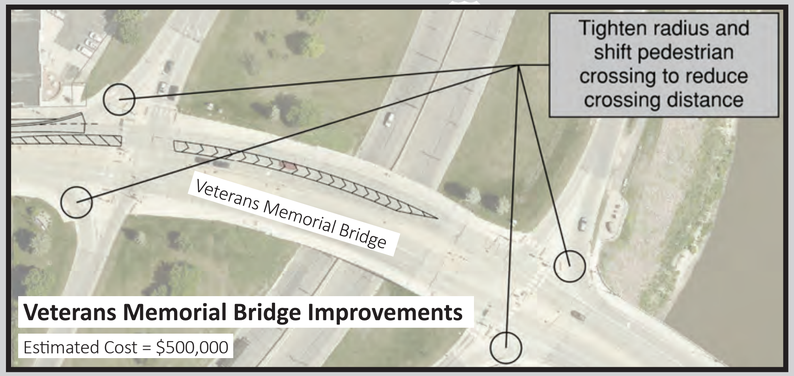
Problem: There is high pedestrian demand in this area of pedestrians and bicyclists traveling to and from the High School, YMCA, and retail destinations. The free right turn for vehicles heading northbound onto Highway 169 is a heavy movement conflicting with a long crosswalk area.

Solution: Lower cost improvement to provide reduced northbound ramp crosswalk distance and provide a right turn lane dedicated to the heavy free right movement.

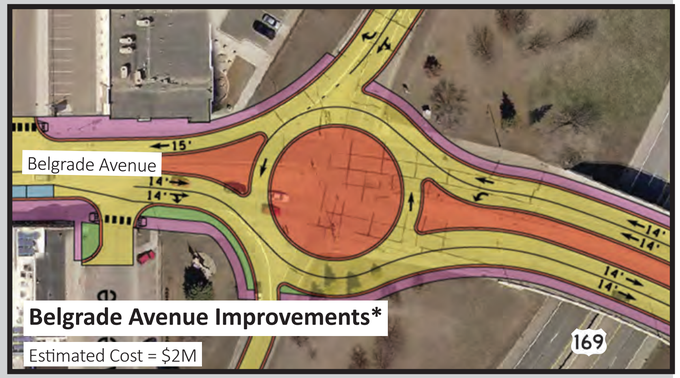
City of Mankato led with cost participation from MnDOT.

*Concepts identified in previous studies that were carried forward and recommended for future further evaluation. These cost estimates are represented in 2017 dollars, all other options are 2021 dollars.

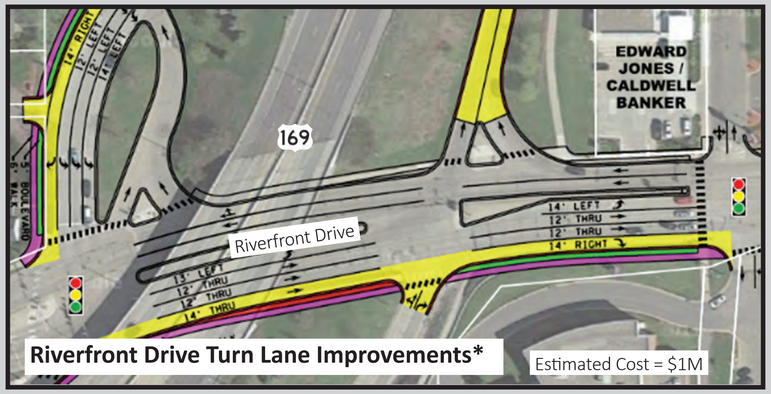
Note: All drawings are conceptual and will require further design and public input to confirm specific details.



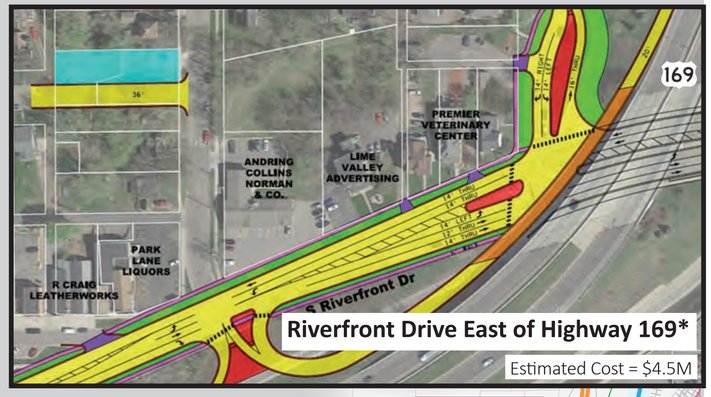
Veterans Memorial Bridge Improvements
Estimated Cost = $500,000



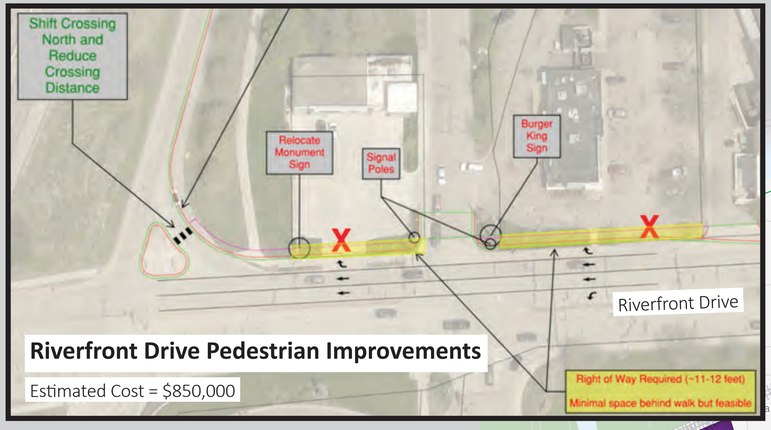
Belgrade Avenue Improvements*
Estimated Cost = $2M



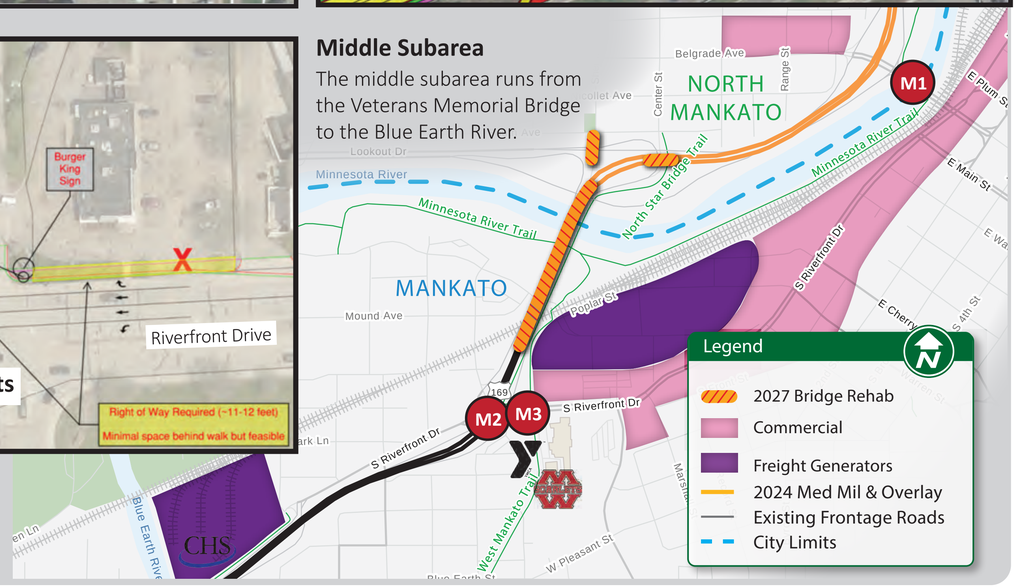
Riverfront Drive Turn Lane Improvements*
Estimated Cost = $1M



Riverfront Drive East of Highway 169*
Estimated Cost = $4.5M



Riverfront Drive Pedestrian Improvements
Estimated Cost = $850,000



Highway 169 Corridor Study Locally Recommended Vision

MAPO MANKATO/NORTH MANKATO AREA PLANNING ORGANIZATION

BOLTON & MENK

Southern Subarea Implementation Plan

The Southern Subarea is not scheduled for construction in the next 10 years Additional design, study, and public input will be needed to confirm the locally recommended corridor vision for this area.

Although there is no funding for this subarea identified through the year 2031, the PMT did identify a locally recommended corridor vision and implementation sequencing as part of the corridor study should funding become available. Further investigation on access control based on development needs or operational and safety issues may result in changes to the corridor vision based on conditions at the time of investment.

Short-Term 2021-2025 Projects

2022 Construction — S1

Hawley Street and Amos Owen Lane Reduced Conflict Intersections (RCUT)

Problem: There was a fatal crash in 2015 involving a left turning vehicle. It is difficult to take a left turn on and off Highway 169 at CR 33 or Hawley Street in the busiest hours of the day. Excessive delays and backups are projected to worsen by 2040.

Solution: Reduced conflict intersection at Amos Owen Lane with south to eastbound left removed and replaced with U-turn west of the intersection. Hawley Street is right-in/right-out. OR. Full RCUT intersection at Amos Owen Lane with Hawley Street remaining open as is today. Public feedback showed support for the safety benefits of Hawley Street as a right-in/right-out.

Improvements at Hawley Street and Amos Owen Lane should be paired with a signalized Green T at CR 33, for safety benefits and to accommodate eastbound and all left turning traffic.

Cost = $2.2M MnDOT led with cost participation from South Bend Township, Blue Earth County, and the City of Mankato.

2022 Construction — S2

Hawley Street Grade Separated Pedestrian Crossing

Problem: The surrounding convenience store, trails and parks, and residential areas create high pedestrian crossing demand.

Solution: Pedestrian grade separation across Highway 169/ Hawley Street intersection. A feasibility study will be required to determine overpass or underpass for the pedestrian grade separation. The video animation included a pedestrian overpass for illustration purposes.

Cost = $5M MnDOT led with cost participation from South Bend Township and the City of Mankato.

2022 Construction — S3

County Road 120 Acceleration Lanes

Problem: Adjacent businesses shared concerns and near misses involving heavy commercial trucks turning on and off Highway 169 into high speed traffic. See final report for layout.

Solution: Add median acceleration lanes at the CR 120/Highway 169 intersection.

Cost = $660,000 MnDOT led with cost participation from Blue Earth County.

Mid-Term 2026-2030 Projects

2030 Construction — S4

High T at Highway 68

Problem: This intersection is experiencing high crash issues and there was a fatal crash in 2015 involving a left turning vehicle. The existing sight distance is inadequate for southbound Highway 169 traffic due to the vertical curvature of the road and current speed limit.

Solution: Construct High T at Highway 68 and County Road 69 median closures with a new local street connection that allows for closure of multiple driveways on Highway 169. County Road 120 intersection would be converted to an RCUT.

Cost = $32.8M MnDOT led project.

2030 Construction — S5

Highway 60 Reduced Conflict Intersection (RCUT)

Problem: The northbound left onto Highway 169 is currently experiencing failing operations in the evening peak hour and intersection operations are expected to worsen by 2040.

Solution: RCUT at Highway 60 and Highway 169 with northbound to westbound access removed and replaced with U-turns and with 208th Lane and Loren Drive access closures and new local road connections.

Cost = $2.8M MnDOT led project.

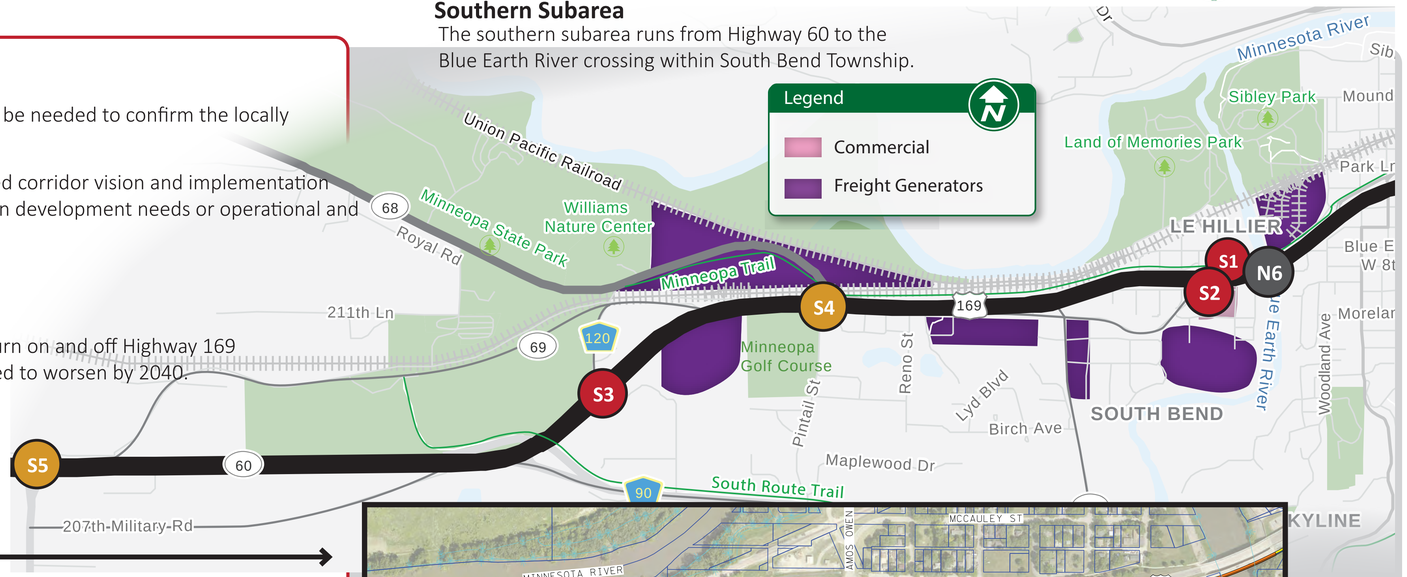
N6 Long-Term 2031+ Development & Safety Driven Projects

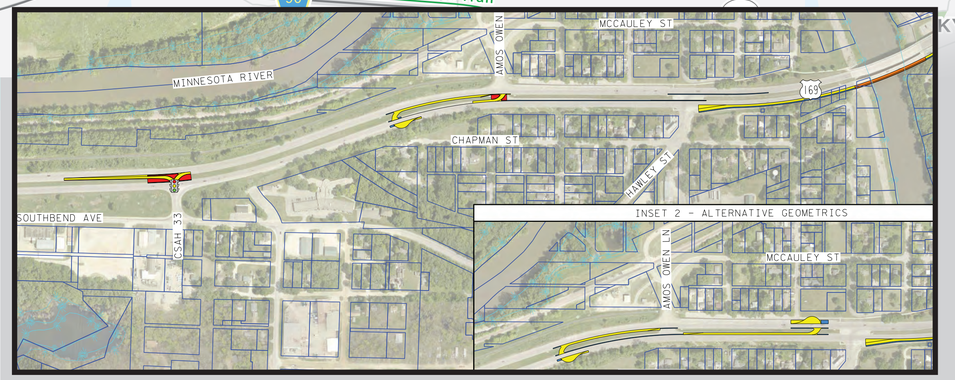
Highway 169 Acceleration Lane ($2.5M).* From Hawley Street to the east across the Blue Earth River.

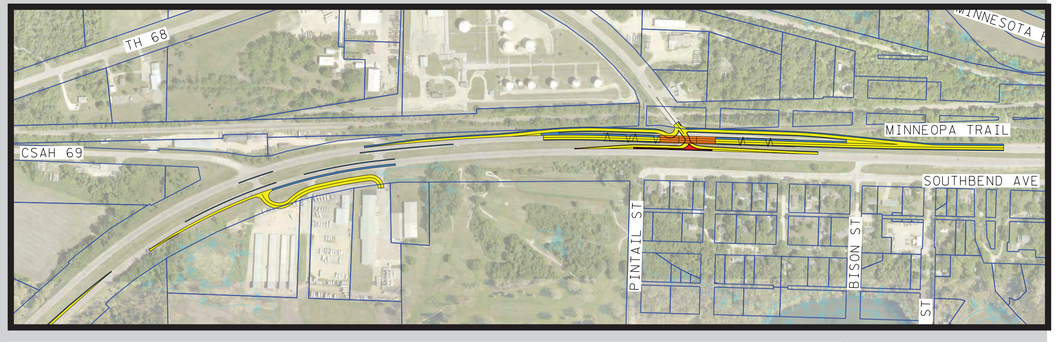
*2021 dollars

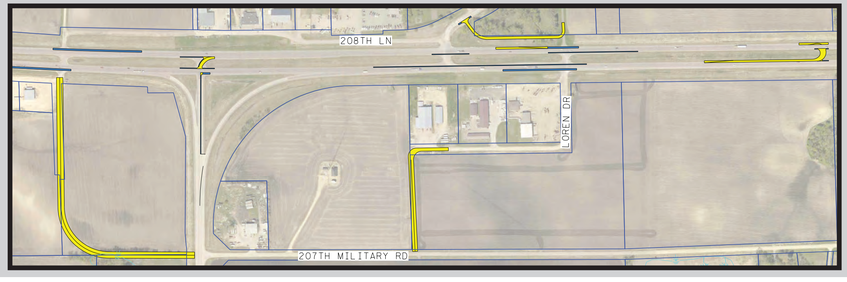
Southern Subarea

The southern subarea runs from Highway 60 to the Blue Earth River crossing within South Bend Township.









Note: All drawings are conceptual and will require further design and public input to confirm specific details.

MAPO Highway 169 Corridor Study

Northern Subarea Implementation Plan

Priority*	Timeframe	Section	Project Name or #	Project Description	Estimated 2022 Cost** and (Anticipated Build Year Cost)	Benefit Cost Ratio	Lead Agency	Cost Participation	Likely Funding Sources	Potential Competitive Funding Sources	Comments
Short-Term 0 to 5 Years	2021 - 2025	Highway 14 interchange	Eastbound Ramp Signal	A standalone traditional signal system at the eastbound Highway 14 exit ramp intersection with Highway 169.	$500,000	161.74	MnDOT	NA	TH, LOCAL	LPP, HSIP	Can be constructed as an independent standalone project to improve operations at the eastbound Highway 14 exit ramp intersection.
				Subtotal	***$500,000***						
Mid-term 6 to 15 Years	2026 - 2030	North River Lane to Webster Avenue	North River Lane and Webster Avenue Roundabouts or Signals	Closure of the Lind Street intersection with a new full access intersection (roundabout or signal) at North River Lane and reconstruction of the Webster Avenue intersection to either a roundabout or leave as signal control. Lind Street closure shall not occur before the new full access intersection at North River Lane is established. Closure of Lind Street and the new full access intersection at North River Lane will require a new local connection on the east side of Hiniker Pond from Lind Street to Butterworth Street and connecting to the North River Lane intersection with Highway 169.	$3.7-7.3M ($4.7-9.3M in 2027 $)	Roundabouts: 2.69 Signals: -2.64	MnDOT	City of Mankato, City of North Mankato	TH, LOCAL	HSIP, LPP, LRIP,COC, MNHFP TED/TEDI, State Bonding Bill	The concept allows for further evaluation of a signal or roundabout control at each intersection. The public and PMT had preference for roundabout controls at each intersection. Either intersection control can be paired with the Eastbound Ramp Signal project or a future Highway 14/169 Diverging Diamond interchange. Should be planned to be paired with MnDOT planned investments for 2027.
		Webster Avenue intersection	Webster Avenue Intersection Modernization	Range Street remains open with modifications to lane striping/utilization on Webster Avenue and Range Street at the intersection. Closee Speedway driveway access to Webster Avenue.	$450,000 ($575,000 in 2027 $)	-	City of North Mankato	NA	LOCAL	LPP, HSIP	To be paired with the North River Lane and Webster Avenue Roundabouts or Signal project. While improvements to operations may occur this concept does not address safety issues to a degree that would make it competitive for funding.
		Highway 14 interchange to Lind Street	Grade Separated Pedestrian Crossings of Highway 169	Public support and evaluation scoring was strongest for the grade separated pedestrian crossing just north of the current Lind Street intersection because the surrounding amenities create pedestrian demand to cross near that location. However agency feedback recognized the benefit of utilizing the existing Highway 14 bridge if possible.	$4M ($5.9M in 2030 $)	-	MnDOT	Cost participation from local agencies based on the MnDOT Cost Participation Policy	TH, LOCAL	LPP, TAP	If paired with a larger roadway reconstruction project the cost of a pedestrian grade separation could be included in a RAISE or INFRA request. More competitive funding options are available if paired with larger roadway project.
				Subtotal	*$8.2-15.7M*						
Opportunity / Development / Safety Driven	Illustrative	Highway 14 interchange	Diverging Diamond Interchange	Reconstruction of the existing Highway 14/169 partial cloverleaf interchange into a diverging diamond interchange with signalized ramp intersections.	$9M	5.08	MnDOT	City of Mankato, City of North Mankato	TH, LOCAL	RAISE, INFRA, COC, MNHFP TED, State Bonding Bill	Only needed with increased development and crash issues associated with the weaving created by the existing cloverleaf ramps. Could be paired with roundabouts or signals at North River Lane and Webster Ave.
		Webster Avenue	Grade Separated Pedestrian Crossings of Highway 169	Agency feedback recognized that a grade separated crossing could also be beneficial at Webster Avenue but would only be needed if pedestrian movements were not adequately accommodated on the Veteran's Memorial Bridge and a future Lind Street area pedestrian grade separation.	$5M	-	City of North Mankato	City of Mankato, MnDOT	TH, LOCAL	LPP, TAP	Should consider pedestrian improvements considered in 2025 Veterans Memorial Bridge project. If paired with a larger roadway reconstruction project the cost of a pedestrian grade separation could be included in a RAISE or INFRA request. More competitive funding options are available if paired with larger roadway project.

*Timing of all projects dependent upon funding availability.

** All estimated costs are for individual improvements only and don't capture the full right-of-way and easement costs. Mid-term costs are inflated to an approximate build year as noted. Opportunity driven costs were not inflated since build year is unknown.

FUNDING KEY

COC Corridors of Commerce Funds (State)

CO County State Aid Highway, County Sales Tax, Wheelage, or Other County Funds

HSIP Highway Safety Improvement Program Funds (Federal)

LOCAL City Funding MSAS or Township

LPP Local Partnership Program Funds (State)

LRIP Local Road Improvement Program Funds (State)

MHFP Minnesota Highway Freight Program Funds (State)

PRIV Private Funding / Development (Private)

SRTS Safe Routes to School

TAP Transportation Alternatives Program (Federal)

STP Surface Transportation Program Funds (Federal)

TE Transportation Enhancement Funds (Federal)

TED/I Transportation Economic Development (State)

TH Trunk Highway Funds (State)

RAISE Rebuilding American Infrastructure with Sustainability and Equity (Federal)

INFRA Infrastructure for Rebuilding America (Federal)

TRLF Transportation Revolving Loan Fund (Federal)

TBACK Turnback Funds (State)

MAPO Highway 169 Corridor Study

Southern Subarea Implementation Plan

Priority*	Timeframe	Section	Project Name or #	Project Description	Estimated 2022 Cost** and (Anticipated Build Year Cost)	Lead Agency***	Cost Participation	Likely Funding Sources	Potential Competitive Funding Sources	Comments
Short-Term 0 to 5 Years	2021 - 2025	1 - Blue Earth River to County Highway 33	1D	Reduced conflict intersection at Amos Owen Lane with southbound to eastbound left removed and replaced with U-turn to the west of the intersection. Hawley Street is right-in/right-out. OR Full R-cut intersection at Amos Owen Lane with Hawley Street remaining open as it is today. Green T with traffic signal, at CR 33, for eastbound and all left turning traffic (northbound to westbound left and westbound to southbound left).	$2.2M	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CSAH, CO	LPP, HSIP, MNHFP, TED	The Amos Owen Lane and County Highway 33 improvements need to be paired together for full safety benefits. The Green T at County Highway 33 is necessary, prior to closure of Hawley Street, to provide for the displaced left turns onto and off of Hwy 169. During the study, MnDOT expressed concern with the addition of a traffic signal at this location due to its rural, high-speed character. MnDOT will revisit this recommendation when a project becomes more imminent to determine if an at-grade Green-T intersection is recommended versus looking towards partial grade separation that would maintain free-flow conditions on Highway 169.
		Hawley Street Pedestrian Bridge	Hawley Street Pedestrian Bridge	Pedestrian overpass across Highway 169/Hawley Street intersection with touchdowns at northwest to southeast quadrants, utilizing State of MN property (NW quadrant) and an undeveloped property (SW quadrant).	$5M	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	DNR, TAP, LPP	High level project cost in 2023 dollars including engineering and contingency estimates. Does not include right-of-way costs for the parcel on the SE quadrant.
		2 - County Highway 33 to County Highway 90	2A	CR 120 acceleration lanes.	$660,000	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	LPP, HSIP	Can be constructed independently as an interim improvement prior to a Highway 68 High-T
				Subtotal	*$7.9M*					
Mid-term 6 to 15 Years	2026 - 2030	2 - County Road 33 to County Highway 90	2A	High T at Highway 68.	$22.2M ($32.8M in 2030 $)	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	HSIP, COC, TED,/TEDI State Bonding Bill	High T to be paired with larger Highway 68 reconstruction project, serving as a capacity building project to be completed prior to the project, and provide a detour for future Highway 14 construction. Alternatively, the project could be modified slightly and paired with 1C instead of 1D and allow for a full median at County Highway 33. Construction will not impact the existing Minneopa Trail Pedestrian Bridge.
				CR 69 median closure and new local street connection to close multiple driveways on Highway 169. Convert CR 120 to R-cut.						County Highway 69 improvements remove all left turns so they must occur after the Highway 68 High T which can replace those movements within this area.
		3- County Road 90 to 133th Lane	3A	208th Lane and Loren Drive access closures with new local road connections. Reduced conflict intersection at Highway 60 at Highway 169 with northbound to westbound removed and replaced with U-turns	$1.9M ($2.8M in 2030 $)	MnDOT	South Bend Township, Blue Earth County, City of Mankato (with orderly annexation)	TH, LOCAL, CO	LPP, HSIP	208th Lane and Loren Drive access closures must happen simultaneously or previous to the Highway 60 and Gadwall Road R-cut.
				Subtotal	*$24.1-35.6M*					
Opportunity / Development / Safety Driven	Illustrative	1 - Blue Earth River to County Highway 33	1D	Acceleration lane from Hawley Street to eastbound Highway 169	$2.5M	MnDOT	TBD	TH	TBD	Time with a Blue Earth River Crossing bridge project.
		2 - County Highway 33 to County Highway 90	2C	CR 68 realignment with Highway 169 and extension of Southbend Ave (CR 69). Includes local driveway and median closures between Highway 68 and CR 69.	$9M	TBD	TBD	TH, LOCAL, CO	TBD	Could be warranted if new industrial, commercial, or residential developments occur. Current local plans do not show planned development that would require these improvements.
		3- County Highway 90 to 133th Lane	3B	Full access intersection at Highway 60 and 169 with access closure at 208th Lane and new local road access. Realignment and extension of Gadwall Road to a new full access intersection with Highway 169 east of the current intersection. Includes cul-de-sac of CR 117 and new local road connections for existing industrial properties.	$5M	TBD	TBD	TH, LOCAL, CO	TBD	Could be warranted if new industrial, commercial, or residential developments occur. Current local plans do not show planned development that would require these improvements.

Timing of all projects dependent upon funding availability.

*** All estimated costs are for individual improvements only and don't capture the full right-of-way and easement costs. Mid-term costs are inflated to an approximate build year as noted. Opportunity driven costs were not inflated since build year is unknown.*

**** Southern Subarea not currently in the MnDot Capital Highway Investment Plan (CHIP)*

FUNDING KEY

COC Corridors of Commerce Funds (State)

CO County State Aid Highway, County Sales Tax, Wheelage, or Other County Funds

HSIP Highway Safety Improvement Program Funds (Federal)

LOCAL City Funding MSAS or Township

LPP Local Partnership Program Funds (State)

LRIP Local Road Improvement Program Funds (State)

MHFP Minnesota Highway Freight Program Funds (State)

PRIV Private Funding / Development (Private)

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TAP Transportation Alternatives Program (Federal)

STP Surface Transportation Program Funds (Federal)

TE Transportation Enhancement Funds (Federal)

TED/I Transportation Economic Development (State)

TH Trunk Highway Funds (State)

RAISE Rebuilding American Infrastructure with Sustainability and Equity (Federal)

TRLF Transportation Revolving Loan Fund (Federal)

TBACK Turnback Funds (State)

Attachment G – Resolutions of Study Approval